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atc
34203

<210> 3

<211> 17

<212> DNA

<213> Artificial Sequence

<220>

<221> misc_feature

<223> Description of Artificial Sequence: A mixed primer
which has a DNA sequence deduced from the amino
acid sequence of PKS of *Aspergillus flavus*.

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<221> modified_base

<222> (6)..(6)

<223> i

<220>

<221> modified_base

<222> (9)..(9)

<223> i

<400> 3

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17

<210> 4

<211> 17

<212> DNA

<213> Artificial Sequence

<220>

<221> misc_feature

<223> Description of Artificial Sequence: A mixed primer
which has a DNA sequence deduced from the amino
acid sequence of PKS of Aspergillus flavus.

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<221> modified_base

<222> (3)..(3)

<223> i

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<222> (6)..(6)

<223> i

<220>

<221> modified_base

<222> (8)..(8)

<223> i

<220>

<221> modified_base

<222> (15)..(15)

<223> i

<400> 4

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17

<210> 5

<211> 19

<212> DNA

<213> Penicillium citrinum

<400> 5

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19

<210> 6

<211> 19

<212> DNA

<213> *Penicillium citrinum*

<400> 6

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19

<210> 7

<211> 18

<212> DNA

<213> *Penicillium citrinum*

<400> 7

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18

<210> 8

<211> 20

<212> DNA

<213> *Penicillium citrinum*

<400> 8

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<210> 9

<211> 20

<212> DNA

<213> *Penicillium citrinum*

<400> 9
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<210> 10

<211> 19

<212> DNA

<213> *Penicillium citrinum*

<400> 10
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19

<210> 11

<211> 20

<212> DNA

<213> *Penicillium citrinum*

<400> 11
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<210> 12

<211> 19

<212> DNA

<213> *Penicillium citrinum*

<400> 12
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<210> 13

<211> 21

<212> DNA

<213> *Penicillium citrinum*

<400> 13

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<210> 14

<211> 19

<212> DNA

<213> *Penicillium citrinum*

<400> 14

gaacatctgc atccccgtc
19

<210> 15

<211> 20

<212> DNA

<213> *Penicillium citrinum*

<400> 15

ggaaggcaaa gaaagtgtac
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<210> 16

<211> 21

<212> DNA

<213> *Penicillium citrinum*

<400> 16

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21

<210> 17

<211> 722

<212> DNA

<213> *Penicillium citrinum*

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120

atcaagccaa ctatccaaac gagccaattg tggtagtggg aagcggttgt cggtttccag
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gtggtgtcaa cacaccatca aaactttggg agctgctcaa agagccccgg gatgtacaga
240

ccaagatccc taaggagaga tttgacgtcg atacatttta cagccccgat ggcactcacc
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ccgggcgcac gaacgcaccc tttgcatact tgctgcagga ggatctacgc ggttttgatg
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420

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480

gatactctac tgctgtgtac gtcggtatga tgacgcatga ctatgagact atcgtgacgc
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600

accgtgtatc atacttcttc gactggcatg ggccgagtat gacgatcgac acagcctgta
660

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722

<210> 18

<211> 760

<212> DNA

<213> *Penicillium citrinum*

<400> 18

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120

aaccgcaacc gcaaccgcaa ccgcaaccgc aaccgcaatg gcaggctcgg cttgctctaa
180

cacatccacg cccattgcc a tagttggaat gggatgtcga tttgctggag atgcaacgag
240

tccacagaag ctttgggaaa tggttgaaag aggaggcagt gcctgggtcta aggtcccctc
300

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360

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420

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cttctacgac ttacgtggtc ccagcgtgac ggttgacacg gcctgttcga cgacattgac
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<210> 19

<211> 773

<212> DNA

<213> *Penicillium citrinum*

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420

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480

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600

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660

cttggccgac gctactattg ccaagttgtt cggtaaaagc gaggagtggc aaaccgcacc
720

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773

<210> 20

<211> 527

<212> DNA

<213> *Penicillium citrinum*

<400> 20

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aaccgattag gttgctcatt cgattttgga gagactacct agctataggt accactccaa
180

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240

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300

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360

tctagctagt accacatacg ttggactact caaagacagc ttcttccatg gccccgcaaa
420

cgttgataaa gcagaatggg gctcttttgt cgaaggaagt cgaagcttga tcaccggccc
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acagaatggc tggaagtggc agagcttcga cggggatgca gatgttc
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<210> 21

<211> 522

<212> DNA

<213> *Penicillium citrinum*

<400> 21

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actatagaag cgccgcgcag tagagattca caccgccctt tgaagcaaaa gtcggaagga
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420

ggtggtacgg cagtgccttat cttctggcta actgtgctct ccagcccctg gccggtaa
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<210> 22

<211> 541

<212> DNA

<213> *Penicillium citrinum*

<400> 22
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<210> 23
<211> 20
<212> DNA
<213> *Penicillium citrinum*

<400> 23
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<210> 24
<211> 20

<212> DNA

<213> *Penicillium citrinum*

<400> 24

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<210> 25

<211> 20

<212> DNA

<213> *Penicillium citrinum*

<400> 25

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<210> 26

<211> 20

<212> DNA

<213> *Penicillium citrinum*

<400> 26

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<210> 27

<211> 20

<212> DNA

<213> *Penicillium citrinum*

<400> 27
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<210> 28

<211> 20

<212> DNA

<213> Penicillium citrinum

<400> 28
ctttcccagc tgctactatc
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<210> 29

<211> 1524

<212> DNA

<213> Penicillium citrinum

<400> 29
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120

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cctgagcgtg ctcagggcca tacagcgagc tctgaagttt gacatgaatg agtgggtcct
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420

gaacactcgt cattttggca ttgccaatg agccactctc cgcttgaccc tgcttgtaat
480

caaagacagc ctggaacaag ggggcgtgtg tctgagtctt gggttcctcg cctgaggtag
540

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600

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660

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780

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1080

cagagaattg ggtcgtatgg cgctgcattt tcaccccgct gtaaattctgc ccgatctcat
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1200

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1260

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1320

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1380

cgctgctata gtcatcgcca gtaacaaagc acgtacggaa gatctcgtga cggcgcaatg
1440

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1500

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1524

<210> 30

<211> 784

<212> DNA

<213> *Penicillium citrinum*

<400> 30

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120

attaaatagt caggctcagc ccaggctcga ttcagattgg attcaggctt cagaccatgg
180

ccgctatgct ccttcgtact atacctccgt cgagctatac ccgcttggcc agacaaaagg
240

cttcactgaa cccttcaact taactgcatt tcgccacaac taactcgacg aggccggcga
300

tggtgttacc attcatgagc tcaaagatcg acacatcaac atggatttca gatgtgatcc
360

agtttcgaag ttcaatggcg acgagtgagt ctacgccgac acctgccagg tttttggacg
420

aggacatgtc gtcttctgcc agaccaaaca ttcgcatcag cttttccgtc attgctttga
480

ggacgataga aatggcctcg tcgtgagagg tgaccctgct tagttggggc cgcacgccat
540

ctggtccttt tttatgcgaa gagacaaagg attggtctgc atgaaggact tggcgggtatt
600

taagtccac aaaccgctgt tcctgtatcc agtttgcctc ggtccagtga gcacccgggg
660

atgtgttgat tcctgtaacc acagctgcgg gaggtgatgg aaattgaggg gaagaacaca
720

ggattgcctt ctccaacaca tccatgacgt ccttttcatg cataggcttg taacctattc
780

tagc
784

<210> 31

<211> 764

<212> DNA

<213> *Penicillium citrinum*

<400> 31

aactggaaga attcgcggcc gcaggaattt tttttttttt ttttttttcc gaataaaatg
60

cgttttatatt tactaaccta ctcgactaat acagcaccta gtttctctgg gacggaaacc
120

attggaataa gcctggggac ggatgcatat ttgttttagt ttgcgtgtta tatcttagca
180

ccggtcatga gggagcggga tgtcctcgtt gcgcggcgt accatgagct ttgtggttgg
240

atgcatacga acgctaaaag cgtgacggta gtatttgtca tcgtctcctg gtacaggctt
300

cacatcatac tgaatcagta tatgagcgag gagaatcttg atttccttcg aggcgaagaa
360

ccgcccggga caagcgcgtg ggttccagcc gaagccgatg tgatcacctg tggatttctc
420

caattgagcg gtgaaggcct tgtctggatc ctcgcgcatg cgcataaatc ggtagggatc
480

ataatttttcg gggttttccc acacatcagg gttgttcatg cggctctgcag ccacagcggc
540

caactcgccc ttgggaatga agaggccatt ggatagagtg atgtctctga gagcgggtact
600

gcgcatagtg gcgcactcga ccggcttgat tcgctgcgtc tctttcatgc agctgtcgag
660

gagcttcagc ttgaacagag aggcaggcgt ccagccccct tctccgatta cagtgcggat
720

ctcttggcgg agaggctgaa taaggtctgg gtgcctggca atgt
764

<210> 32

<211> 765

<212> DNA

<213> *Penicillium citrinum*

<400> 32

aactggaaga attcgcggcc gcaggaattt tttttttttt ttttttctgg aaaaggacca
60

tctctttata tattcttctt ccctactact tgcacgtaa atttcaacaa catataaaca
120

tgagataccc tttctggccg ttcactctac cacctgcctg tctcattgca ttgtgctttt
180

gaaaattatg acaataacaa ccaatgagaa aaaatatgat cctcctgcaa tgaatccact
240

ggagggggta cggagcttgg aatgctccta agattccgac ctaatcagcg tcgagcccga
300

tcagtagctg cagcactcgg cctcagtga ttgttaggaa cagggactgt cctgggtccg
360

cctgacgggg agacacttcg agaaggggct gaagatgccg gggcagaacg gttgtgcgcc
420

atgtgcgcct tgaccaggtg accggcggct agggcagcac atagcgagag ctccccagcc
480

aaaacagcgc ttccgatgat gcgcgcaagt tgacgtgcat tctcaccggg agtggtcggg
540

tgtgatccgc ggacaccaag catgtcaagc attgcgccct ggggctccag aatcgtacca
600

ccgccaacg ttccaacctc aatagacggc atggagacag agatttgaag cgatccgcga
660

agattgttca tgagagtgat gcagttagcg ctctccacaa cttgcgccgg atcctgacct
720

gtggcaatga aaatggctgc cgcaagattg gcagcttggg cgttg
765

<210> 33

<211> 802

<212> DNA

<213> *Penicillium citrinum*

<400> 33

aactggaaga attcgcggcc gcaggaattt tttttttttt tttttataga atctttgaaa
60

tgcacattaa ttaagtatgt ggagattctt tgtggaggca cggtaatgtg tctatctagc
120

aacgcggtca agcatcagtc tcaggcacag cccgggtgtc gtttttggtt gcaatcttcc
180

gccatcccat tccaaaggca aacacaaacg tgcacgccgt agtcccact gctaagtaaa
240

aagtatgatc aacggcgaga ctgtaagctt ttacaacccc tggaagggtta ttcttgctga
300

ccacatctct gaagccagtc gcccctgctg ccgtcacggc ctgcgtgtcg acagtgggcg
360

catacttgct caggccagtt ctcaaaccgg acccaaagac aagggttagca aagtccagga
420

agagcgatcc tccaaacgtc tgtccaaaca cggcgagaga aattccgagg gcaccttggt
480

cgggcgaaag cgtgcttttg atggcgatga taggcgtttg catgccacaa ccacgaccga
540

agcccgcgat aaattggtac atgacccatt tcacagttga tgtatggggc tggaaggtgg
600

ataccagacc tgcgcctatg gcgacgagaa cagcgctgcc tagggcccaa ggcaaatagt
660

atcctgtctt tccaattgcg aagccagaaa ccatagccat aatgacttgt ccaagaattc
720

caggcaacat gtacacacca ctcaagtgtg gagaaacatc cttcacagcc tggaagtaga
780

tcggtagata gtaggaaaag ac
802

<210> 34

<211> 562

<212> DNA

<213> *Penicillium citrinum*

<400> 34

aactggaaga attcgcggcc gcaggaattt tttttttttt ttttttttac taagcaatat
60

tgtgtttctt cgctaattgcg aatatttcct tatagcaacg tcgcaacaca tttatcgtct
120

tccctgaggc ctttgttgac ttgggctctt cgtctccggc ttcgtcactc caaagcacag
180

ataggagacg agaggccggc gttatggttt tattttcagc gccaaggatt tgccacgatg
240

tgcttggcat atctgatagg actagacgaa tagatgccgc agccccgtgc tcctgtgcta
300

tcccaaagc agtctcaatc cactcaata gtcgaaggct tacacgcaat gtcgtgcatg
360

cagaagataa ggcgtgcatg aatgggtcga gatgtgaaat gagctcgccg atatgaagat
420

tagagtgaag cgagggaagt gcttcggctc ttccattgtc atttctagtg gttgagccag
480

accagtagca atccattcgt gtgctttgct tttgtccaca aggttgggct ttcattcacct
540

cggatagtag cagctgggaa ag
562

<210> 35

<211> 26

<212> DNA

<213> *Penicillium citrinum*

<400> 35
gttaacatgt cagaacctct accccc
26

<210> 36

<211> 27

<212> DNA

<213> *Penicillium citrinum*

<400> 36
aatatttcaa gcatcagtct caggcac
27

<210> 37

<211> 1662

<212> DNA

<213> *Penicillium citrinum*

<220>

<221> CDS

<222> (1)..(1662)

<400> 37

atg tca gaa cct cta ccc cct aaa gaa ggg gaa cca agg cca cag aag

48

Met Ser Glu Pro Leu Pro Pro Lys Glu Gly Glu Pro Arg Pro Gln Lys

1

5

10

15

gaa gaa agt caa aat gac acg ctc gaa gcg act gag tcc aag tcc cag

96

Glu Glu Ser Gln Asn Asp Thr Leu Glu Ala Thr Glu Ser Lys Ser Gln

20

25

30

cac atc aca ggc ctc aag ctc ggg ctg gtg gtt gct tca gtt act ttc

144

His Ile Thr Gly Leu Lys Leu Gly Leu Val Val Ala Ser Val Thr Phe

35

40

45

gta gca ttt ttg atg ctc ctt gat atg tcc att atc gtc acg gca atc

192

Val Ala Phe Leu Met Leu Leu Asp Met Ser Ile Ile Val Thr Ala Ile

50

55

60

cca cat atc aca agc gag ttc cac tct ctg aac gat gta ggg tgg tac

240

Pro His Ile Thr Ser Glu Phe His Ser Leu Asn Asp Val Gly Trp Tyr

65

70

75

80

ggc agt gct tat ctt ctg gct aac tgt gct ctc cag ccc ctg gcc ggt

288

Gly Ser Ala Tyr Leu Leu Ala Asn Cys Ala Leu Gln Pro Leu Ala Gly

85

90

95

aaa ttg tat aca ctc ttg ggc ttg aag tac act ttc ttt gcc ttc ctc

336

Lys Leu Tyr Thr Leu Leu Gly Leu Lys Tyr Thr Phe Phe Ala Phe Leu

100	105	110
tgt att ttt gaa cta ggc tcg gtg cta tgc ggt gcc gca aga tct tcc		
384		
Cys Ile Phe Glu Leu Gly Ser Val Leu Cys Gly Ala Ala Arg Ser Ser		
115	120	125
acc atg ttg att gtt ggg cgg gcc gtt gct gga atg gga ggc tca ggt		
432		
Thr Met Leu Ile Val Gly Arg Ala Val Ala Gly Met Gly Gly Ser Gly		
130	135	140
ctt gtc aac gga gcc ctc aca atc ctc tca aca gct gct cct aag cac		
480		
Leu Val Asn Gly Ala Leu Thr Ile Leu Ser Thr Ala Ala Pro Lys His		
145	150	155
aag caa cca gtt ttg att gga gtg atg atg ggt ctt agt cag att gcc		
528		
Lys Gln Pro Val Leu Ile Gly Val Met Met Gly Leu Ser Gln Ile Ala		
165	170	175
att gtc tgt gga cca ctg ctc gga ggt gct ttc act caa cac gcc act		
576		
Ile Val Cys Gly Pro Leu Leu Gly Gly Ala Phe Thr Gln His Ala Thr		
180	185	190
tgg cga tgg tgc ttt tat atc aat ctc ccc atc ggc gct gtc gct gca		
624		
Trp Arg Trp Cys Phe Tyr Ile Asn Leu Pro Ile Gly Ala Val Ala Ala		
195	200	205
ttc ctc ctt ctc gtc atc acc ata ccc gac cga att tca tcc acg gac		
672		
Phe Leu Leu Leu Val Ile Thr Ile Pro Asp Arg Ile Ser Ser Thr Asp		

210	215	220	
agc gaa ctc tcg acc gac aaa cca atg gcc aac ata aaa tcc aca ctt			
720			
Ser Glu Leu Ser Thr Asp Lys Pro Met Ala Asn Ile Lys Ser Thr Leu			
225	230	235	240
cgc aaa ctg gac ctt gta ggc ttt gtg gtc ttt gca gcc ttc gca acc			
768			
Arg Lys Leu Asp Leu Val Gly Phe Val Val Phe Ala Ala Phe Ala Thr			
245	250	255	
atg att tcc ctc gca cta gaa tgg gga ggg tcg acc tac acc tgg cga			
816			
Met Ile Ser Leu Ala Leu Glu Trp Gly Gly Ser Thr Tyr Thr Trp Arg			
260	265	270	
agt tcc gtc atc atc ggc ctg ttc tgt ggc gga ggg ttt gct ctg att			
864			
Ser Ser Val Ile Ile Gly Leu Phe Cys Gly Gly Gly Phe Ala Leu Ile			
275	280	285	
gcg ttc gtg cta tgg gag cgt cat gtt ggc gat gct gtt gcc atg att			
912			
Ala Phe Val Leu Trp Glu Arg His Val Gly Asp Ala Val Ala Met Ile			
290	295	300	
cct ggc tca gtg gct ggt aaa cga caa gtg tgg tgc tct tgt tta ttt			
960			
Pro Gly Ser Val Ala Gly Lys Arg Gln Val Trp Cys Ser Cys Leu Phe			
305	310	315	320
atg ggc ttt ttc tct ggc tcc ttg ctt gtc ttt tcc tac tat cta ccg			
1008			
Met Gly Phe Phe Ser Gly Ser Leu Leu Val Phe Ser Tyr Tyr Leu Pro			
325	330	335	

atc tac ttc cag gct gtg aag gat gtt tct ccc aca ctg agt ggt gtg
1056

Ile Tyr Phe Gln Ala Val Lys Asp Val Ser Pro Thr Leu Ser Gly Val

340

345

350

tac atg ttg cct gga att ctt gga caa gtc att atg gct atg gtt tct
1104

Tyr Met Leu Pro Gly Ile Leu Gly Gln Val Ile Met Ala Met Val Ser

355

360

365

ggc ttc gca att gga aag aca gga tac tat ttg cct tgg gcc cta ggc
1152

Gly Phe Ala Ile Gly Lys Thr Gly Tyr Tyr Leu Pro Trp Ala Leu Gly

370

375

380

agc gct gtt ctc gtc gcc ata ggc gca ggt ctg gta tcc acc ttc cag
1200

Ser Ala Val Leu Val Ala Ile Gly Ala Gly Leu Val Ser Thr Phe Gln

385

390

395

400

ccc cat aca tca act gtg aaa tgg gtc atg tac caa ttt atc gcg ggc
1248

Pro His Thr Ser Thr Val Lys Trp Val Met Tyr Gln Phe Ile Ala Gly

405

410

415

ttc ggt cgt ggt tgt ggc atg caa acg cct atc atc gcc atc caa agc
1296

Phe Gly Arg Gly Cys Gly Met Gln Thr Pro Ile Ile Ala Ile Gln Ser

420

425

430

acg ctt tcg ccc gaa caa ggt gcc ctc gga att tct ctc gcc gtg ttt
1344

Thr Leu Ser Pro Glu Gln Gly Ala Leu Gly Ile Ser Leu Ala Val Phe

435

440

445

gga cag acg ttt gga gga tcg ctc ttc ctg gac ttt gct aac ctt gtc
1392

Gly Gln Thr Phe Gly Gly Ser Leu Phe Leu Asp Phe Ala Asn Leu Val

450

455

460

ttt ggg tcc ggt ttg aga act ggc ctg agc aag tat gcg ccc act gtc
1440

Phe Gly Ser Gly Leu Arg Thr Gly Leu Ser Lys Tyr Ala Pro Thr Val

465

470

475

480

gac acg cag gcc gtg acg gca gca ggg gcg act ggc ttc aga gat gtg
1488

Asp Thr Gln Ala Val Thr Ala Ala Gly Ala Thr Gly Phe Arg Asp Val

485

490

495

gtc agc aag aat aac ctt cca ggg gtt gta aaa gct tac agt ctc gcc
1536

Val Ser Lys Asn Asn Leu Pro Gly Val Val Lys Ala Tyr Ser Leu Ala

500

505

510

gtt gat cat act ttt tac tta gca gtg gga gct acg gcg tgc acg ttt
1584

Val Asp His Thr Phe Tyr Leu Ala Val Gly Ala Thr Ala Cys Thr Phe

515

520

525

gtg ttt gcc ttt gga atg gga tgg cgg aag att gca acc aaa aac gac
1632

Val Phe Ala Phe Gly Met Gly Trp Arg Lys Ile Ala Thr Lys Asn Asp

530

535

540

acc cgg gct gtg cct gag act gat gct tga
1662

Thr Arg Ala Val Pro Glu Thr Asp Ala

545

550

<210> 38

<211> 553

<212> PRT

<213> Penicillium citrinum

<400> 38

Met Ser Glu Pro Leu Pro Pro Lys Glu Gly Glu Pro Arg Pro Gln Lys
1 5 10 15

Glu Glu Ser Gln Asn Asp Thr Leu Glu Ala Thr Glu Ser Lys Ser Gln
20 25 30

His Ile Thr Gly Leu Lys Leu Gly Leu Val Val Ala Ser Val Thr Phe
35 40 45

Val Ala Phe Leu Met Leu Leu Asp Met Ser Ile Ile Val Thr Ala Ile
50 55 60

Pro His Ile Thr Ser Glu Phe His Ser Leu Asn Asp Val Gly Trp Tyr
65 70 75 80

Gly Ser Ala Tyr Leu Leu Ala Asn Cys Ala Leu Gln Pro Leu Ala Gly
85 90 95

Lys Leu Tyr Thr Leu Leu Gly Leu Lys Tyr Thr Phe Phe Ala Phe Leu
100 105 110

Cys Ile Phe Glu Leu Gly Ser Val Leu Cys Gly Ala Ala Arg Ser Ser
115 120 125

Thr Met Leu Ile Val Gly Arg Ala Val Ala Gly Met Gly Gly Ser Gly
130 135 140

Leu Val Asn Gly Ala Leu Thr Ile Leu Ser Thr Ala Ala Pro Lys His
145 150 155 160

Lys Gln Pro Val Leu Ile Gly Val Met Met Gly Leu Ser Gln Ile Ala
165 170 175

Ile Val Cys Gly Pro Leu Leu Gly Gly Ala Phe Thr Gln His Ala Thr
180 185 190

Trp Arg Trp Cys Phe Tyr Ile Asn Leu Pro Ile Gly Ala Val Ala Ala
195 200 205

Phe Leu Leu Leu Val Ile Thr Ile Pro Asp Arg Ile Ser Ser Thr Asp
210 215 220

Ser Glu Leu Ser Thr Asp Lys Pro Met Ala Asn Ile Lys Ser Thr Leu
225 230 235 240

Arg Lys Leu Asp Leu Val Gly Phe Val Val Phe Ala Ala Phe Ala Thr
245 250 255

Met Ile Ser Leu Ala Leu Glu Trp Gly Gly Ser Thr Tyr Thr Trp Arg
260 265 270

Ser Ser Val Ile Ile Gly Leu Phe Cys Gly Gly Gly Phe Ala Leu Ile
275 280 285

Ala Phe Val Leu Trp Glu Arg His Val Gly Asp Ala Val Ala Met Ile
290 295 300

Pro Gly Ser Val Ala Gly Lys Arg Gln Val Trp Cys Ser Cys Leu Phe
305 310 315 320

Met Gly Phe Phe Ser Gly Ser Leu Leu Val Phe Ser Tyr Tyr Leu Pro
325 330 335

Ile Tyr Phe Gln Ala Val Lys Asp Val Ser Pro Thr Leu Ser Gly Val
340 345 350

Tyr Met Leu Pro Gly Ile Leu Gly Gln Val Ile Met Ala Met Val Ser

355

360

365

Gly Phe Ala Ile Gly Lys Thr Gly Tyr Tyr Leu Pro Trp Ala Leu Gly
 370 375 380

Ser Ala Val Leu Val Ala Ile Gly Ala Gly Leu Val Ser Thr Phe Gln
 385 390 395 400

Pro His Thr Ser Thr Val Lys Trp Val Met Tyr Gln Phe Ile Ala Gly
 405 410 415

Phe Gly Arg Gly Cys Gly Met Gln Thr Pro Ile Ile Ala Ile Gln Ser
 420 425 430

Thr Leu Ser Pro Glu Gln Gly Ala Leu Gly Ile Ser Leu Ala Val Phe
 435 440 445

Gly Gln Thr Phe Gly Gly Ser Leu Phe Leu Asp Phe Ala Asn Leu Val
 450 455 460

Phe Gly Ser Gly Leu Arg Thr Gly Leu Ser Lys Tyr Ala Pro Thr Val
 465 470 475 480

Asp Thr Gln Ala Val Thr Ala Ala Gly Ala Thr Gly Phe Arg Asp Val
 485 490 495

Val Ser Lys Asn Asn Leu Pro Gly Val Val Lys Ala Tyr Ser Leu Ala
 500 505 510

Val Asp His Thr Phe Tyr Leu Ala Val Gly Ala Thr Ala Cys Thr Phe
 515 520 525

Val Phe Ala Phe Gly Met Gly Trp Arg Lys Ile Ala Thr Lys Asn Asp
 530 535 540

Thr Arg Ala Val Pro Glu Thr Asp Ala
 545 550

<210> 39

<211> 31

<212> DNA

<213> *Penicillium citrinum*

<400> 39

ggatccatgt ccctgccgca tgcaacgatt c
31

<210> 40

<211> 30

<212> DNA

<213> *Penicillium citrinum*

<400> 40

ggatccctaa gcaatattgt gtttcttcgc
30

<210> 41

<211> 1380

<212> DNA

<213> *Penicillium citrinum*

<220>

<221> CDS

<222> (1)..(1380)

<400> 41

atg tcc ctg ccg cat gca acg att ccg acg aac cta cgc cgt cgc gcg

48

Met Ser Leu Pro His Ala Thr Ile Pro Thr Asn Leu Arg Arg Arg Ala

1

5

10

15

ttt cga cgc tca tgt gac cgg tgt cat gca caa aag ctc aaa tgt acc

96

Phe Arg Arg Ser Cys Asp Arg Cys His Ala Gln Lys Leu Lys Cys Thr

20

25

30

ggg agc aat gcc aat tta gtc cgt gct cag tgt caa cgt tgt caa caa

144

Gly Ser Asn Ala Asn Leu Val Arg Ala Gln Cys Gln Arg Cys Gln Gln

35

40

45

gcc gga tta agg tgt gtg tac agc gaa agg cta ccc aag cgc aat tta

192

Ala Gly Leu Arg Cys Val Tyr Ser Glu Arg Leu Pro Lys Arg Asn Leu

50

55

60

cat aaa gaa gcc gca gct gga act aca aga gcc aca gaa acc tca caa

240

His Lys Glu Ala Ala Ala Gly Thr Thr Arg Ala Thr Glu Thr Ser Gln

65

70

75

80

ccg atg acc gcg aca tct tct acg gtc ttc tca tca ttg gca gag act

288

Pro Met Thr Ala Thr Ser Ser Thr Val Phe Ser Ser Leu Ala Glu Thr

85

90

95

cct cca cct tac tgc tca cca cct acg cat att ggc acc tcg gca ctc

336

Pro Pro Pro Tyr Cys Ser Pro Pro Thr His Ile Gly Thr Ser Ala Leu

100

105

110

aag gaa aca tta tca gaa cca tca gcg gca acc ctg caa ttc tat gat

384

Lys Glu Thr Leu Ser Glu Pro Ser Ala Ala Thr Leu Gln Phe Tyr Asp

115

120

125

aca tca atc aac ttt gat gat ccc gag tcg ttt ccc ggc ggc tgg cct
432

Thr Ser Ile Asn Phe Asp Asp Pro Glu Ser Phe Pro Gly Gly Trp Pro

130

135

140

cag cca aat aca ttt cgc gac gat gcc aac agc aat gaa tct tcg ggg
480

Gln Pro Asn Thr Phe Arg Asp Asp Ala Asn Ser Asn Glu Ser Ser Gly

145

150

155

160

ata cca gat cta ggc tac gac ttt gaa ggc cct ttg gat gca acg gcg
528

Ile Pro Asp Leu Gly Tyr Asp Phe Glu Gly Pro Leu Asp Ala Thr Ala

165

170

175

cct gtc tcg cca tcg ctg ttt gac ctc gaa gta gag ggg aac tcg tca
576

Pro Val Ser Pro Ser Leu Phe Asp Leu Glu Val Glu Gly Asn Ser Ser

180

185

190

tcc gga caa tcc aac aca agc aac acg caa cga gac ctt ttc gaa agt
624

Ser Gly Gln Ser Asn Thr Ser Asn Thr Gln Arg Asp Leu Phe Glu Ser

195

200

205

ctg tcg gat gtg tca cag gac cta gag gta ata ctc cac ggg gtg act
672

Leu Ser Asp Val Ser Gln Asp Leu Glu Val Ile Leu His Gly Val Thr

210

215

220

gtg gaa tgg ccc aag caa aaa att tta agc tac ccg ata ggg gac ttt
720

Val Glu Trp Pro Lys Gln Lys Ile Leu Ser Tyr Pro Ile Gly Asp Phe

225 230 235 240

ttg aat gcc ttt ggt aga ttg cta cta cat ctt caa gaa cgt gtg atc
768

Leu Asn Ala Phe Gly Arg Leu Leu Leu His Leu Gln Glu Arg Val Ile

245 250 255

acg agc agc aat agc agc atg tta gat ggg tgt ctg caa acc aag aac
816

Thr Ser Ser Asn Ser Ser Met Leu Asp Gly Cys Leu Gln Thr Lys Asn

260 265 270

ttg ttc atg gcg gtg cat tgc tac atg ttg tct gtc aaa atc atg aca
864

Leu Phe Met Ala Val His Cys Tyr Met Leu Ser Val Lys Ile Met Thr

275 280 285

tca ctt tcc cag ctg cta cta tcc gag gtg atg aaa gcc caa cct tgt
912

Ser Leu Ser Gln Leu Leu Leu Ser Glu Val Met Lys Ala Gln Pro Cys

290 295 300

gga caa aag caa agc aca cga atg gat tgg tac tgg tct ggc tca acc
960

Gly Gln Lys Gln Ser Thr Arg Met Asp Trp Tyr Trp Ser Gly Ser Thr

305 310 315 320

act aga aat gac aat gga aga gcc gaa gca ctt ccc tcg ttt cac tct
1008

Thr Arg Asn Asp Asn Gly Arg Ala Glu Ala Leu Pro Ser Phe His Ser

325 330 335

aat ctt cat atc ggc gag ctc att tca cat ctc gac cca ttc atg cac
1056

Asn Leu His Ile Gly Glu Leu Ile Ser His Leu Asp Pro Phe Met His

340	345	350
gcc tta tct tct gca tgc acg aca ttg cgt gta agc ctt cga cta ttg		
1104		
Ala Leu Ser Ser Ala Cys Thr Thr Leu Arg Val Ser Leu Arg Leu Leu		
355	360	365
agt gag att gag act gct ttg ggg ata gca cag gag cac ggg gct gcg		
1152		
Ser Glu Ile Glu Thr Ala Leu Gly Ile Ala Gln Glu His Gly Ala Ala		
370	375	380
gca tct att cgt cta gtc cta tca gat atg cca agc aca tcg tgg caa		
1200		
Ala Ser Ile Arg Leu Val Leu Ser Asp Met Pro Ser Thr Ser Trp Gln		
385	390	395
atc ctt ggc gct gaa aat aaa acc ata acg ccg gcc tct cgt ctc cta		
1248		
Ile Leu Gly Ala Glu Asn Lys Thr Ile Thr Pro Ala Ser Arg Leu Leu		
405	410	415
tct gtg ctt tgg agt gac gaa gcc gga gac gaa gag ccc aag tca aca		
1296		
Ser Val Leu Trp Ser Asp Glu Ala Gly Asp Glu Glu Pro Lys Ser Thr		
420	425	430
aag gcc tca ggg aag acg ata aat gtg ttg cga cgt tgc tat aag gaa		
1344		
Lys Ala Ser Gly Lys Thr Ile Asn Val Leu Arg Arg Cys Tyr Lys Glu		
435	440	445
ata ttc gca tta gcg aag aaa cac aat att gct tag		
1380		
Ile Phe Ala Leu Ala Lys Lys His Asn Ile Ala		
450	455	

<210> 42

<211> 459

<212> PRT

<213> Penicillium citrinum

<400> 42

Met Ser Leu Pro His Ala Thr Ile Pro Thr Asn Leu Arg Arg Arg Ala
1 5 10 15

Phe Arg Arg Ser Cys Asp Arg Cys His Ala Gln Lys Leu Lys Cys Thr
20 25 30

Gly Ser Asn Ala Asn Leu Val Arg Ala Gln Cys Gln Arg Cys Gln Gln
35 40 45

Ala Gly Leu Arg Cys Val Tyr Ser Glu Arg Leu Pro Lys Arg Asn Leu
50 55 60

His Lys Glu Ala Ala Ala Gly Thr Thr Arg Ala Thr Glu Thr Ser Gln
65 70 75 80

Pro Met Thr Ala Thr Ser Ser Thr Val Phe Ser Ser Leu Ala Glu Thr
85 90 95

Pro Pro Pro Tyr Cys Ser Pro Pro Thr His Ile Gly Thr Ser Ala Leu
100 105 110

Lys Glu Thr Leu Ser Glu Pro Ser Ala Ala Thr Leu Gln Phe Tyr Asp
115 120 125

Thr Ser Ile Asn Phe Asp Asp Pro Glu Ser Phe Pro Gly Gly Trp Pro
130 135 140

Gln Pro Asn Thr Phe Arg Asp Asp Ala Asn Ser Asn Glu Ser Ser Gly
145 150 155 160

Ile Pro Asp Leu Gly Tyr Asp Phe Glu Gly Pro Leu Asp Ala Thr Ala
165 170 175

Pro Val Ser Pro Ser Leu Phe Asp Leu Glu Val Glu Gly Asn Ser Ser
180 185 190

Ser Gly Gln Ser Asn Thr Ser Asn Thr Gln Arg Asp Leu Phe Glu Ser
195 200 205

Leu Ser Asp Val Ser Gln Asp Leu Glu Val Ile Leu His Gly Val Thr
210 215 220

Val Glu Trp Pro Lys Gln Lys Ile Leu Ser Tyr Pro Ile Gly Asp Phe
225 230 235 240

Leu Asn Ala Phe Gly Arg Leu Leu Leu His Leu Gln Glu Arg Val Ile
245 250 255

Thr Ser Ser Asn Ser Ser Met Leu Asp Gly Cys Leu Gln Thr Lys Asn
260 265 270

Leu Phe Met Ala Val His Cys Tyr Met Leu Ser Val Lys Ile Met Thr
275 280 285

Ser Leu Ser Gln Leu Leu Leu Ser Glu Val Met Lys Ala Gln Pro Cys
290 295 300

Gly Gln Lys Gln Ser Thr Arg Met Asp Trp Tyr Trp Ser Gly Ser Thr
305 310 315 320

Thr Arg Asn Asp Asn Gly Arg Ala Glu Ala Leu Pro Ser Phe His Ser
325 330 335

Asn Leu His Ile Gly Glu Leu Ile Ser His Leu Asp Pro Phe Met His
340 345 350

Ala Leu Ser Ser Ala Cys Thr Thr Leu Arg Val Ser Leu Arg Leu Leu
355 360 365

Ser Glu Ile Glu Thr Ala Leu Gly Ile Ala Gln Glu His Gly Ala Ala
370 375 380

Ala Ser Ile Arg Leu Val Leu Ser Asp Met Pro Ser Thr Ser Trp Gln
385 390 395 400

Ile Leu Gly Ala Glu Asn Lys Thr Ile Thr Pro Ala Ser Arg Leu Leu
405 410 415

Ser Val Leu Trp Ser Asp Glu Ala Gly Asp Glu Glu Pro Lys Ser Thr
420 425 430

Lys Ala Ser Gly Lys Thr Ile Asn Val Leu Arg Arg Cys Tyr Lys Glu
435 440 445

Ile Phe Ala Leu Ala Lys Lys His Asn Ile Ala
450 455

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<211> 9099

<212> DNA

<213> Penicillium citrinum

<220>

<221> CDS

<222> (1)..(9099)

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48

Met Asp Gln Ala Asn Tyr Pro Asn Glu Pro Ile Val Val Val Gly Ser
1 5 10 15

ggt tgt cgg ttt cca ggt ggt gtc aac aca cca tca aaa ctt tgg gag
96
Gly Cys Arg Phe Pro Gly Gly Val Asn Thr Pro Ser Lys Leu Trp Glu
20 25 30

ctg ctc aaa gag ccc cgg gat gta cag acc aag atc cct aag gag aga
144
Leu Leu Lys Glu Pro Arg Asp Val Gln Thr Lys Ile Pro Lys Glu Arg
35 40 45

ttt gac gtc gat aca ttt tac agc ccc gat ggc act cac ccc ggg cgc
192
Phe Asp Val Asp Thr Phe Tyr Ser Pro Asp Gly Thr His Pro Gly Arg
50 55 60

acg aac gca ccc ttt gca tac ttg ctg cag gag gat cta cgc ggt ttt
240
Thr Asn Ala Pro Phe Ala Tyr Leu Leu Gln Glu Asp Leu Arg Gly Phe
65 70 75 80

gat gcc tct ttc ttc aac atc caa gct gga gag gcc gaa acg att gac
288
Asp Ala Ser Phe Phe Asn Ile Gln Ala Gly Glu Ala Glu Thr Ile Asp
85 90 95

cca cag caa agg ctg ctg ctg gag acg gtc tat gaa gct gta tcc aac
336
Pro Gln Gln Arg Leu Leu Leu Glu Thr Val Tyr Glu Ala Val Ser Asn
100 105 110

gca ggc cta cgg atc caa ggc ctt caa gga tcc tct act gct gtg tac
384
Ala Gly Leu Arg Ile Gln Gly Leu Gln Gly Ser Ser Thr Ala Val Tyr

115	120	125
gtc ggt atg atg acg cat gac tat gag act atc gtg acg cgt gaa ttg		
432		
Val Gly Met Met Thr His Asp Tyr Glu Thr Ile Val Thr Arg Glu Leu		
130	135	140
gat agt att cct aca tac tct gcc acg ggg gta gct gtc agt gtg gcc		
480		
Asp Ser Ile Pro Thr Tyr Ser Ala Thr Gly Val Ala Val Ser Val Ala		
145	150	155
tcc aac cgt gta tca tac ttc ttc gac tgg cat ggg ccg agt atg acg		
528		
Ser Asn Arg Val Ser Tyr Phe Phe Asp Trp His Gly Pro Ser Met Thr		
165	170	175
atc gac aca gcc tgt agt tca tcc tta gct gcc gtg cat ctg gcc gtc		
576		
Ile Asp Thr Ala Cys Ser Ser Ser Leu Ala Ala Val His Leu Ala Val		
180	185	190
caa cag ctt aga acg ggc gag agt acc atg gcg gtt gca gcc ggt gcg		
624		
Gln Gln Leu Arg Thr Gly Glu Ser Thr Met Ala Val Ala Ala Gly Ala		
195	200	205
aat ctg ata ttg ggc ccc atg acc ttt gta atg gag agc aaa ttg aac		
672		
Asn Leu Ile Leu Gly Pro Met Thr Phe Val Met Glu Ser Lys Leu Asn		
210	215	220
atg ctg tcc ccc aat ggt aga tct cga atg tgg gat gct gct gcc gat		
720		
Met Leu Ser Pro Asn Gly Arg Ser Arg Met Trp Asp Ala Ala Ala Asp		

225	230	235	240
gga tat gcc aga gga gaa ggt gtt tgc tct att gtc ctg aaa acg ctg			
768			
Gly Tyr Ala Arg Gly Glu Gly Val Cys Ser Ile Val Leu Lys Thr Leu			
	245	250	255
agc cag gca ctg cgc gac ggg gac agt atc gag tgt gtt atc cga gag			
816			
Ser Gln Ala Leu Arg Asp Gly Asp Ser Ile Glu Cys Val Ile Arg Glu			
	260	265	270
acc ggt atc aac caa gat ggc cga acg aca ggt atc aca atg cca aac			
864			
Thr Gly Ile Asn Gln Asp Gly Arg Thr Thr Gly Ile Thr Met Pro Asn			
	275	280	285
cat agc gca caa gaa gcc ctc att cgg gcc aca tat gcc aag gct ggt			
912			
His Ser Ala Gln Glu Ala Leu Ile Arg Ala Thr Tyr Ala Lys Ala Gly			
	290	295	300
ctt gat att acc aac ccc cag gaa cgc tgc cag ttc ttt gaa gcc cat			
960			
Leu Asp Ile Thr Asn Pro Gln Glu Arg Cys Gln Phe Phe Glu Ala His			
305	310	315	320
gga act ggt aca cca gcc ggt gac cca cag gaa gct gag gct att gca			
1008			
Gly Thr Gly Thr Pro Ala Gly Asp Pro Gln Glu Ala Glu Ala Ile Ala			
	325	330	335
aca gcc ttc ttc gga cac aag gat gga aca atc gac agc gac ggc gag			
1056			
Thr Ala Phe Phe Gly His Lys Asp Gly Thr Ile Asp Ser Asp Gly Glu			
	340	345	350

aaa gat gag ctt ttt gtc ggc agc atc aag aca gtt ctc ggt cac acg
1104

Lys Asp Glu Leu Phe Val Gly Ser Ile Lys Thr Val Leu Gly His Thr

355

360

365

gaa ggc act gct ggt att gcg ggc tta atg aag gca tcg ttt gct gta
1152

Glu Gly Thr Ala Gly Ile Ala Gly Leu Met Lys Ala Ser Phe Ala Val

370

375

380

cga aat ggc gtg atc ccg cca aac ctg ctg ttt gag aag atc agt ccc
1200

Arg Asn Gly Val Ile Pro Pro Asn Leu Leu Phe Glu Lys Ile Ser Pro

385

390

395

400

cgt gtc gct ccg ttc tat acg cac ttg aaa att gca acg gag gcc aca
1248

Arg Val Ala Pro Phe Tyr Thr His Leu Lys Ile Ala Thr Glu Ala Thr

405

410

415

gaa tgg ccg att gtt gcg ccc ggg cag cct cgc aga gtc agc gtt aat
1296

Glu Trp Pro Ile Val Ala Pro Gly Gln Pro Arg Arg Val Ser Val Asn

420

425

430

tca ttt gga ttt ggt ggt aca aat gcc cat gct att atc gaa gag tat
1344

Ser Phe Gly Phe Gly Gly Thr Asn Ala His Ala Ile Ile Glu Glu Tyr

435

440

445

atg gct cct cca cac aag ccg aca gca gtg gta aca gag gtg acc tca
1392

Met Ala Pro Pro His Lys Pro Thr Ala Val Val Thr Glu Val Thr Ser

450

455

460

gat gca gat gca tgc agc ttg ccc ctt gtg ctt tca tcg aag tcg cag
 1440
 Asp Ala Asp Ala Cys Ser Leu Pro Leu Val Leu Ser Ser Lys Ser Gln
 465 470 475 480

cgc tcc atg aag gca acg cta gaa aat atg ctc caa ttt ctg gaa acg
 1488
 Arg Ser Met Lys Ala Thr Leu Glu Asn Met Leu Gln Phe Leu Glu Thr
 485 490 495

cat gat gac gtg gac atg cat gat atc gca tat acc tta ctt gag aaa
 1536
 His Asp Asp Val Asp Met His Asp Ile Ala Tyr Thr Leu Leu Glu Lys
 500 505 510

cgg tct atc ttg ccc ttc cgt cgt gcg att gca gca cac aac aag gaa
 1584
 Arg Ser Ile Leu Pro Phe Arg Arg Ala Ile Ala Ala His Asn Lys Glu
 515 520 525

gta gcc cgc gcg gca ctg gag gct gcc atc gcg gac ggt gag gtc gtc
 1632
 Val Ala Arg Ala Ala Leu Glu Ala Ala Ile Ala Asp Gly Glu Val Val
 530 535 540

acc gac ttc cgc acc gac gcg aat gac aac cct cgc gta cta ggt gtc
 1680
 Thr Asp Phe Arg Thr Asp Ala Asn Asp Asn Pro Arg Val Leu Gly Val
 545 550 555 560

ttt act ggc caa ggt gca cag tgg ccg ggc atg ctg aag aag ctc atg
 1728
 Phe Thr Gly Gln Gly Ala Gln Trp Pro Gly Met Leu Lys Lys Leu Met
 565 570 575

gtg ggt atg cca ttt gtg aga ggc att ctc gaa gag ctg gat aat tca

1776
Val Gly Met Pro Phe Val Arg Gly Ile Leu Glu Glu Leu Asp Asn Ser
580 585 590

ctg caa aca ctg cct gaa aag tat cgg cct acg tgg aca ctg tat gac
1824
Leu Gln Thr Leu Pro Glu Lys Tyr Arg Pro Thr Trp Thr Leu Tyr Asp
595 600 605

cag ctc atg ctt gaa ggg gat gcc tca aac gtc aga ctc gcc agc ttc
1872
Gln Leu Met Leu Glu Gly Asp Ala Ser Asn Val Arg Leu Ala Ser Phe
610 615 620

tcc cag cct cta tgc tgc gcc gta caa atc gtt ctg gtc cga ctt ctc
1920
Ser Gln Pro Leu Cys Cys Ala Val Gln Ile Val Leu Val Arg Leu Leu
625 630 635 640

gct gca gct ggt atc gag ttc agt gca att gtc ggc cac agt tca ggt
1968
Ala Ala Ala Gly Ile Glu Phe Ser Ala Ile Val Gly His Ser Ser Gly
645 650 655

gag att gcc tgt gcc ttt gcg gca gga ttc atc agt gcc act caa gct
2016
Glu Ile Ala Cys Ala Phe Ala Ala Gly Phe Ile Ser Ala Thr Gln Ala
660 665 670

atc cgt att gcg cat ctg cgt gga gtt gtg tcc gcg gag cat gcc tct
2064
Ile Arg Ile Ala His Leu Arg Gly Val Val Ser Ala Glu His Ala Ser
675 680 685

tct cca agc ggc cag aca ggc gct atg cta gcg gca ggt atg tcg tac
2112

Ser Pro Ser Gly Gln Thr Gly Ala Met Leu Ala Ala Gly Met Ser Tyr
690 695 700

gat gac gca aag gaa cta tgc gag ctc gaa gcc ttt gag ggt cgg gtc
2160
Asp Asp Ala Lys Glu Leu Cys Glu Leu Glu Ala Phe Glu Gly Arg Val
705 710 715 720

tgc gtc gcc gct agc aat tca ccg gat agt gtg acc ttc tcc ggc gac
2208
Cys Val Ala Ala Ser Asn Ser Pro Asp Ser Val Thr Phe Ser Gly Asp
725 730 735

atg gat gct atc cag cac gtt gaa ggt gtc ttg gag gat gaa tcc act
2256
Met Asp Ala Ile Gln His Val Glu Gly Val Leu Glu Asp Glu Ser Thr
740 745 750

ttt gcc aga atc ttg aga gtt gac aag gcc tac cat tcg cat cac atg
2304
Phe Ala Arg Ile Leu Arg Val Asp Lys Ala Tyr His Ser His His Met
755 760 765

cac cca tgc gca gct cca tat gtc aag gca ttg ctg gag tgc gac tgt
2352
His Pro Cys Ala Ala Pro Tyr Val Lys Ala Leu Leu Glu Cys Asp Cys
770 775 780

gct gtt gcc gat ggc caa ggt aac gat agt gtt gct tgg ttc tct gcc
2400
Ala Val Ala Asp Gly Gln Gly Asn Asp Ser Val Ala Trp Phe Ser Ala
785 790 795 800

gtc cac gag acc agc aag caa atg act gta cag gat gtg atg ccc gct
2448
Val His Glu Thr Ser Lys Gln Met Thr Val Gln Asp Val Met Pro Ala

805	810	815
tat tgg aaa gac aat ctc gtc tct ccg gtc ttg ttc tcg cag gct gtg		
2496		
Tyr Trp Lys Asp Asn Leu Val Ser Pro Val Leu Phe Ser Gln Ala Val		
820	825	830
cag aaa gca gtc atc act cat cgt cta atc gac gtc gcc atc gaa att		
2544		
Gln Lys Ala Val Ile Thr His Arg Leu Ile Asp Val Ala Ile Glu Ile		
835	840	845
ggc gcc cac cct gct ctc aag ggt ccg tgt cta gcc acc atc aag gat		
2592		
Gly Ala His Pro Ala Leu Lys Gly Pro Cys Leu Ala Thr Ile Lys Asp		
850	855	860
gct ctt gcc ggt gtg gag ctg ccg tat acc ggg tgc ttg gca cga aac		
2640		
Ala Leu Ala Gly Val Glu Leu Pro Tyr Thr Gly Cys Leu Ala Arg Asn		
865	870	875
ggt gac gat gtg gac gct ttt gct gga ggt ctg gga tac att tgg gag		
2688		
Val Asp Asp Val Asp Ala Phe Ala Gly Gly Leu Gly Tyr Ile Trp Glu		
885	890	895
cgt ttc gga gtt cgg agt atc gac gcc gag ggc ttc gta caa caa gtc		
2736		
Arg Phe Gly Val Arg Ser Ile Asp Ala Glu Gly Phe Val Gln Gln Val		
900	905	910
cgg ccc gat cgt gcc gtt caa aac ctg tca aag tca ttg ccc aca tac		
2784		
Arg Pro Asp Arg Ala Val Gln Asn Leu Ser Lys Ser Leu Pro Thr Tyr		

915	920	925
tct tgg gat cat act cgt caa tac tgg gca gaa tct cgc tcc acc cgc		
2832		
Ser Trp Asp His Thr Arg Gln Tyr Trp Ala Glu Ser Arg Ser Thr Arg		
930	935	940
cag cat ctt cgt gga ggt gcg ccc cat ctt ctg ctt gga aag ctt tct		
2880		
Gln His Leu Arg Gly Gly Ala Pro His Leu Leu Leu Gly Lys Leu Ser		
945	950	955
		960
tct tac agc aca gca tcg acc ttc cag tgg aca aac ttc atc agg ccc		
2928		
Ser Tyr Ser Thr Ala Ser Thr Phe Gln Trp Thr Asn Phe Ile Arg Pro		
	965	970
		975
cgg gat ctg gaa tgg ctc gac ggt cat gcg cta caa ggc cag act gtg		
2976		
Arg Asp Leu Glu Trp Leu Asp Gly His Ala Leu Gln Gly Gln Thr Val		
	980	985
		990
ttc ccc gct gct ggg tac ata att atg gcc atg gaa gct gcc atg aag		
3024		
Phe Pro Ala Ala Gly Tyr Ile Ile Met Ala Met Glu Ala Ala Met Lys		
995	1000	1005
gtg gct ggt gag cgt gcc gcc caa gtt cag ctc ctg gaa atc ttg		
3069		
Val Ala Gly Glu Arg Ala Ala Gln Val Gln Leu Leu Glu Ile Leu		
1010	1015	1020
gac atg agc atc aac aaa gcc atc gtg ttt gaa gat gaa aac acc		
3114		
Asp Met Ser Ile Asn Lys Ala Ile Val Phe Glu Asp Glu Asn Thr		
1025	1030	1035

tcc gtg gag ctg aac ttg aca gcc gaa gtc acc agt gac aat gat
3159

Ser Val Glu Leu Asn Leu Thr Ala Glu Val Thr Ser Asp Asn Asp

1040

1045

1050

gcg gat ggc caa gtc acg gtc aaa ttt gtt att gat tcc tgt ctg
3204

Ala Asp Gly Gln Val Thr Val Lys Phe Val Ile Asp Ser Cys Leu

1055

1060

1065

gca aag gag agt gag ctt tcg aca tcc gcc aaa ggc caa atc gtc
3249

Ala Lys Glu Ser Glu Leu Ser Thr Ser Ala Lys Gly Gln Ile Val

1070

1075

1080

ata acc ctt ggc gag gca tca ccg tca tcg cag ctt ttg ccg cca
3294

Ile Thr Leu Gly Glu Ala Ser Pro Ser Ser Gln Leu Leu Pro Pro

1085

1090

1095

cct gag gaa gag tac ccc cag atg aac aat gtc aac atc gat ttc
3339

Pro Glu Glu Glu Tyr Pro Gln Met Asn Asn Val Asn Ile Asp Phe

1100

1105

1110

ttc tat cgg gaa ctt gac ctc ctt ggg tat gac tac agc aaa gac
3384

Phe Tyr Arg Glu Leu Asp Leu Leu Gly Tyr Asp Tyr Ser Lys Asp

1115

1120

1125

ttc cgt cgt ttg cag acc atg aga agg gcc gac tcc aaa gct agc
3429

Phe Arg Arg Leu Gln Thr Met Arg Arg Ala Asp Ser Lys Ala Ser

1130

1135

1140

ggc acc ttg gct ttc ctt cca ctt aag gat gaa ttg cgc aat gag
 3474
 Gly Thr Leu Ala Phe Leu Pro Leu Lys Asp Glu Leu Arg Asn Glu

1145

1150

1155

ccc ctc ttg ctc cac cca gcg ccc ctg gac atc gcg ttc cag act
 3519
 Pro Leu Leu Leu His Pro Ala Pro Leu Asp Ile Ala Phe Gln Thr

1160

1165

1170

gtc att gga gcg tat tcc tct cca gga gat cgt cgc cta cgc tca
 3564
 Val Ile Gly Ala Tyr Ser Ser Pro Gly Asp Arg Arg Leu Arg Ser

1175

1180

1185

ttg tac gtg cct act cac gtt gac aga gtg act ctg att cca tcg
 3609
 Leu Tyr Val Pro Thr His Val Asp Arg Val Thr Leu Ile Pro Ser

1190

1195

1200

ctc tgt ata tcg gcg ggt aat tct ggt gaa acc gag ctt gcg ttt
 3654
 Leu Cys Ile Ser Ala Gly Asn Ser Gly Glu Thr Glu Leu Ala Phe

1205

1210

1215

gac aca atc aac aca cac gac aag ggt gat ttc ctg agc ggc gac
 3699
 Asp Thr Ile Asn Thr His Asp Lys Gly Asp Phe Leu Ser Gly Asp

1220

1225

1230

atc acg gtg tac gat tcg acc aag aca acg ctt ttc caa gtt gat
 3744
 Ile Thr Val Tyr Asp Ser Thr Lys Thr Thr Leu Phe Gln Val Asp

1235

1240

1245

aac att gtc ttt aag cct ttc tct ccc ccg act gct tcg acc gac

3789
 Asn Ile Val Phe Lys Pro Phe Ser Pro Pro Thr Ala Ser Thr Asp
 1250 1255 1260

 cac cga atc ttc gca aag tgg gtc tgg gga ccc ctc acg ccc gaa
 3834
 His Arg Ile Phe Ala Lys Trp Val Trp Gly Pro Leu Thr Pro Glu
 1265 1270 1275

 aaa ctg ctg gag gac cct gcg acg ttg atc ata gct cgg gac aag
 3879
 Lys Leu Leu Glu Asp Pro Ala Thr Leu Ile Ile Ala Arg Asp Lys
 1280 1285 1290

 gag gac att ctg acc atc gag cga atc gtt tac ttc tac atc aaa
 3924
 Glu Asp Ile Leu Thr Ile Glu Arg Ile Val Tyr Phe Tyr Ile Lys
 1295 1300 1305

 tcc ttc cta gcc cag ata acc ccc gac gac cgt caa aat gcc gac
 3969
 Ser Phe Leu Ala Gln Ile Thr Pro Asp Asp Arg Gln Asn Ala Asp
 1310 1315 1320

 ctc cat tcc cag aag tac att gaa tgg tgt gac cag gtt cag gcc
 4014
 Leu His Ser Gln Lys Tyr Ile Glu Trp Cys Asp Gln Val Gln Ala
 1325 1330 1335

 gat gct cgg gct ggc cac cat cag tgg tac cag gag tct tgg gag
 4059
 Asp Ala Arg Ala Gly His His Gln Trp Tyr Gln Glu Ser Trp Glu
 1340 1345 1350

 gag gac act tct gtt cac att gag caa atg tgt gaa agc aac tcg
 4104

Glu Asp	Thr Ser Val His Ile	Glu Gln Met Cys Glu	Ser Asn Ser
1355	1360	1365	

tcc cac	cca cat gtg cgc ctg	atc caa agg gta ggc	aaa gaa tta
4149			
Ser His	Pro His Val Arg Leu	Ile Gln Arg Val Gly	Lys Glu Leu
1370	1375	1380	

att tca	att gtt cgc ggg aac	ggg gat cct ttg gat	atc atg aac
4194			
Ile Ser	Ile Val Arg Gly Asn	Gly Asp Pro Leu Asp	Ile Met Asn
1385	1390	1395	

cgc gat	ggg ttg ttc acc gag	tac tat acc aac aag	ctc gcc ttt
4239			
Arg Asp	Gly Leu Phe Thr Glu	Tyr Tyr Thr Asn Lys	Leu Ala Phe
1400	1405	1410	

ggc tca	gca ata cac gtc gtt	cag gat ctg gtt agc	caa att gct
4284			
Gly Ser	Ala Ile His Val Val	Gln Asp Leu Val Ser	Gln Ile Ala
1415	1420	1425	

cat cgc	tac caa tcc att gat	atc ctt gag atc ggc	ttg ggt aca
4329			
His Arg	Tyr Gln Ser Ile Asp	Ile Leu Glu Ile Gly	Leu Gly Thr
1430	1435	1440	

ggc atc	gcc acg aag cgc gtt	ctt gca tca cct caa	ctt ggt ttc
4374			
Gly Ile	Ala Thr Lys Arg Val	Leu Ala Ser Pro Gln	Leu Gly Phe
1445	1450	1455	

aac agt	tac act tgc act gac	atc tcg gcg gat gtt	att ggc aag
4419			
Asn Ser	Tyr Thr Cys Thr Asp	Ile Ser Ala Asp Val	Ile Gly Lys

1460	1465	1470
gcc cgt gaa caa ctt tcc gaa ttc gac ggt ctc atg cag ttt gag 4464		
Ala Arg Glu Gln Leu Ser Glu Phe Asp Gly Leu Met Gln Phe Glu		
1475	1480	1485
gca cta gac atc aac aga agc cca gca gag caa gga ttc aag cct 4509		
Ala Leu Asp Ile Asn Arg Ser Pro Ala Glu Gln Gly Phe Lys Pro		
1490	1495	1500
cac tcc tac gat ctg att att gca tcc gat gtc ctc cat gcc agc 4554		
His Ser Tyr Asp Leu Ile Ile Ala Ser Asp Val Leu His Ala Ser		
1505	1510	1515
tcc aac ttc gag gaa aaa ttg gct cac ata agg tcc ttg ctc aag 4599		
Ser Asn Phe Glu Glu Lys Leu Ala His Ile Arg Ser Leu Leu Lys		
1520	1525	1530
ccg ggt ggt cac ttg gtt act ttc ggg gtc acc cat cgc gag cct 4644		
Pro Gly Gly His Leu Val Thr Phe Gly Val Thr His Arg Glu Pro		
1535	1540	1545
gct cgc ctc gcc ttc atc tct ggg ctt ttc gct gat cga tgg act 4689		
Ala Arg Leu Ala Phe Ile Ser Gly Leu Phe Ala Asp Arg Trp Thr		
1550	1555	1560
gga gaa gac gaa act cgt gct ttg agt gcc tcg ggg tcc gtt gac 4734		
Gly Glu Asp Glu Thr Arg Ala Leu Ser Ala Ser Gly Ser Val Asp		

1565	1570	1575
caa tgg gag cat acc ctc aag 4779	aga gtt ggg ttc tct	ggc gtc gat
Gln Trp Glu His Thr Leu Lys	Arg Val Gly Phe Ser	Gly Val Asp
1580	1585	1590
agt cgg aca ctt gat cga gag 4824	gat gat ttg atc ccg	tct gtc ttc
Ser Arg Thr Leu Asp Arg Glu	Asp Asp Leu Ile Pro	Ser Val Phe
1595	1600	1605
agt aca cat gct gtg gat gcc 4869	acc gtt gag cgt ttg	tat gat cca
Ser Thr His Ala Val Asp Ala	Thr Val Glu Arg Leu	Tyr Asp Pro
1610	1615	1620
ctt tct gct cca ttg aag gac 4914	tca tac ccg cca tta	gtg gtt atc
Leu Ser Ala Pro Leu Lys Asp	Ser Tyr Pro Pro Leu	Val Val Ile
1625	1630	1635
ggt ggc gaa tcg aca aaa acc 4959	gaa cgc att ttg aac	gac atg aaa
Gly Gly Glu Ser Thr Lys Thr	Glu Arg Ile Leu Asn	Asp Met Lys
1640	1645	1650
gct gcc cta ccg cat aga cac 5004	atc cac tcc gtc aag	cgg ctg gaa
Ala Ala Leu Pro His Arg His	Ile His Ser Val Lys	Arg Leu Glu
1655	1660	1665
agt gtt ctc gac gac ccg gcc 5049	ttg cag cct aag tcg	act ttt gtc
Ser Val Leu Asp Asp Pro Ala	Leu Gln Pro Lys Ser	Thr Phe Val
1670	1675	1680

atc ctc tcg gaa ctt gat gat gaa gtg ttt tgc aac ctt gaa gag
5094

Ile Leu Ser Glu Leu Asp Asp Glu Val Phe Cys Asn Leu Glu Glu

1685

1690

1695

gac aag ttt gag gca gtc aag tct ctt ctc ttc tac gcc gga cgc
5139

Asp Lys Phe Glu Ala Val Lys Ser Leu Leu Phe Tyr Ala Gly Arg

1700

1705

1710

atg atg tgg ctg aca gag aat gcc tgg att gat cat ccc cac cag
5184

Met Met Trp Leu Thr Glu Asn Ala Trp Ile Asp His Pro His Gln

1715

1720

1725

gcc agc acc atc gga atg ttg agg aca atc aag ctc gag aac cct
5229

Ala Ser Thr Ile Gly Met Leu Arg Thr Ile Lys Leu Glu Asn Pro

1730

1735

1740

gac ttg gga acg cac gtc ttc gat gtc gat act gtg gag aac cta
5274

Asp Leu Gly Thr His Val Phe Asp Val Asp Thr Val Glu Asn Leu

1745

1750

1755

gac acc aaa ttc ttc gtt gag caa ctt ttg cgc ttc gag gag agc
5319

Asp Thr Lys Phe Phe Val Glu Gln Leu Leu Arg Phe Glu Glu Ser

1760

1765

1770

gat gat cag ctt ttg gaa tca ata aca tgg act cat gag ccc gaa
5364

Asp Asp Gln Leu Leu Glu Ser Ile Thr Trp Thr His Glu Pro Glu

1775

1780

1785

gtg tac tgg tgc aag ggt cgt gcc tgg gtc cct cgt ttg aag cag
 5409
 Val Tyr Trp Cys Lys Gly Arg Ala Trp Val Pro Arg Leu Lys Gln

1790

1795

1800

gat att gct agg aac gac cgt atg aac tcg tct cgt cgt cca att
 5454
 Asp Ile Ala Arg Asn Asp Arg Met Asn Ser Ser Arg Arg Pro Ile

1805

1810

1815

ttc ggt aac ttt aat tcg tcc aag acg gcc att gca ctg aaa gag
 5499
 Phe Gly Asn Phe Asn Ser Ser Lys Thr Ala Ile Ala Leu Lys Glu

1820

1825

1830

gcg agg gga gca tcc tca tcg atg tac tat ctt gag tca acc gag
 5544
 Ala Arg Gly Ala Ser Ser Ser Met Tyr Tyr Leu Glu Ser Thr Glu

1835

1840

1845

acg tgt gat tcg tta gaa gac gct cgt cat gct gga aaa gca act
 5589
 Thr Cys Asp Ser Leu Glu Asp Ala Arg His Ala Gly Lys Ala Thr

1850

1855

1860

gtt cgt gtt cgc tac gct ctt ccc cag gca att cgc gtg ggc cat
 5634
 Val Arg Val Arg Tyr Ala Leu Pro Gln Ala Ile Arg Val Gly His

1865

1870

1875

ctc gga tac ttc cat gtc gtg cag ggc agt att ctg gag aat aca
 5679
 Leu Gly Tyr Phe His Val Val Gln Gly Ser Ile Leu Glu Asn Thr

1880

1885

1890

tgt gag gtg cct gta gtc gcc ctg gct gag aag aat gga tct ata

5724
 Cys Glu Val Pro Val Val Ala Leu Ala Glu Lys Asn Gly Ser Ile
 1895 1900 1905

ctg cat gta ccg aga aac tac atg cat agt ctg ccc gat aac atg
 5769
 Leu His Val Pro Arg Asn Tyr Met His Ser Leu Pro Asp Asn Met
 1910 1915 1920

gcg gaa ggc gag gat agt tcc ttc ttg ttg tcc aca gct gca gcc
 5814
 Ala Glu Gly Glu Asp Ser Ser Phe Leu Leu Ser Thr Ala Ala Ala
 1925 1930 1935

ctc ctt gcc gaa aca att ctc tct agc gct cag tcc ttt ggc tct
 5859
 Leu Leu Ala Glu Thr Ile Leu Ser Ser Ala Gln Ser Phe Gly Ser
 1940 1945 1950

gat gca tca att ctg att atg gag ccc cca atc ttc tgc gtc aaa
 5904
 Asp Ala Ser Ile Leu Ile Met Glu Pro Pro Ile Phe Cys Val Lys
 1955 1960 1965

gca att ctg gag tcg gcc aaa acc tac ggt gtt cag gtt cat ttg
 5949
 Ala Ile Leu Glu Ser Ala Lys Thr Tyr Gly Val Gln Val His Leu
 1970 1975 1980

gca aca act ctg tcc gac gtc aaa act att ccg gct cct tgg atc
 5994
 Ala Thr Thr Leu Ser Asp Val Lys Thr Ile Pro Ala Pro Trp Ile
 1985 1990 1995

cga tta cat gcc aag gaa acc gac gct cgg ctg aaa cac agc ctg
 6039

Arg	Leu	His	Ala	Lys	Glu	Thr	Asp	Ala	Arg	Leu	Lys	His	Ser	Leu
2000						2005			2010					

ccg	aca	aac	atg	atg	gca	ttc	ttt	gac	ttg	tct	acc	gac	cgg	act
6084														
Pro	Thr	Asn	Met	Met	Ala	Phe	Phe	Asp	Leu	Ser	Thr	Asp	Arg	Thr
2015						2020			2025					

gct	gcc	ggg	ata	acc	aac	cgt	ttg	gcc	aag	ttg	cta	cca	ccc	agt
6129														
Ala	Ala	Gly	Ile	Thr	Asn	Arg	Leu	Ala	Lys	Leu	Leu	Pro	Pro	Ser
2030						2035			2040					

tgc	ttc	atg	tac	agt	ggc	gac	tat	ctt	atc	cga	agt	aca	gct	tcc
6174														
Cys	Phe	Met	Tyr	Ser	Gly	Asp	Tyr	Leu	Ile	Arg	Ser	Thr	Ala	Ser
2045						2050			2055					

aca	tac	aaa	gtt	agt	cat	gtt	gag	gat	att	cca	atc	ctc	gag	cac
6219														
Thr	Tyr	Lys	Val	Ser	His	Val	Glu	Asp	Ile	Pro	Ile	Leu	Glu	His
2060						2065			2070					

tct	gtg	gca	atg	gca	aaa	aat	acc	gtc	tct	gcg	tcg	act	gtc	gac
6264														
Ser	Val	Ala	Met	Ala	Lys	Asn	Thr	Val	Ser	Ala	Ser	Thr	Val	Asp
2075						2080			2085					

gac	act	gag	aaa	gtt	att	aca	gcc	aca	caa	att	ctc	ttg	cct	ggc
6309														
Asp	Thr	Glu	Lys	Val	Ile	Thr	Ala	Thr	Gln	Ile	Leu	Leu	Pro	Gly
2090						2095			2100					

cag	ctc	tct	gtc	aac	cac	aat	gac	caa	cgc	ttc	aat	ctg	gcc	acc
6354														
Gln	Leu	Ser	Val	Asn	His	Asn	Asp	Gln	Arg	Phe	Asn	Leu	Ala	Thr

2105	2110	2115
gtc atc 6399	gac tgg aag gaa aat	gag gtg tcc gct agg att tgc ccc
Val Ile	Asp Trp Lys Glu Asn	Glu Val Ser Ala Arg Ile Cys Pro
2120	2125	2130
atc gac 6444	tct ggt aac tta ttt	tcc aac aag aag acg tat ttg ctt
Ile Asp	Ser Gly Asn Leu Phe	Ser Asn Lys Lys Thr Tyr Leu Leu
2135	2140	2145
gtt ggt 6489	ctt acc ggg gac ctt	ggg cgc tct ctc tgt cgc tgg atg
Val Gly	Leu Thr Gly Asp Leu	Gly Arg Ser Leu Cys Arg Trp Met
2150	2155	2160
atc ttg 6534	cat ggc gcc cgc cat	gtt gtg ctc act agc cgg aac cct
Ile Leu	His Gly Ala Arg His	Val Val Leu Thr Ser Arg Asn Pro
2165	2170	2175
cga ctt 6579	gat ccc aaa tgg atc	gcc aac atg gag gca ctt ggt ggt
Arg Leu	Asp Pro Lys Trp Ile	Ala Asn Met Glu Ala Leu Gly Gly
2180	2185	2190
gac atc 6624	acc gtt ctg tca atg	gat gtt gcc aat gag gat tca gtc
Asp Ile	Thr Val Leu Ser Met	Asp Val Ala Asn Glu Asp Ser Val
2195	2200	2205
gat gct 6669	ggc ctt ggc aag ctt	gtc gat atg aag ttg cca cct gtt
Asp Ala	Gly Leu Gly Lys Leu	Val Asp Met Lys Leu Pro Pro Val

2210	2215	2220
gcc ggc atc gcg ttc ggg cct ttg gtg ctg cag gat gtc atg ctg 6714		
Ala Gly Ile Ala Phe Gly Pro Leu Val Leu Gln Asp Val Met Leu		
2225	2230	2235
aag aac atg gac cac cag atg atg gac atg gtg ttg aag ccc aag 6759		
Lys Asn Met Asp His Gln Met Met Asp Met Val Leu Lys Pro Lys		
2240	2245	2250
gta caa gga gca cgc att ctt cat gaa cgg ttc tcc gaa cag acg 6804		
Val Gln Gly Ala Arg Ile Leu His Glu Arg Phe Ser Glu Gln Thr		
2255	2260	2265
ggc agc aag gcg ctc gac ttc ttc atc atg ttt tcg tcc att gtt 6849		
Gly Ser Lys Ala Leu Asp Phe Phe Ile Met Phe Ser Ser Ile Val		
2270	2275	2280
gca gtt att ggc aat cct ggc cag tcc aac tat ggc gct gcg aat 6894		
Ala Val Ile Gly Asn Pro Gly Gln Ser Asn Tyr Gly Ala Ala Asn		
2285	2290	2295
gcc tac cta cag gct ctg gcc cag caa cgg tgc gcc aga gga ttg 6939		
Ala Tyr Leu Gln Ala Leu Ala Gln Gln Arg Cys Ala Arg Gly Leu		
2300	2305	2310
gcg gga tca acc atc gat att ggt gcc gtt tac ggt gta ggg ttt 6984		
Ala Gly Ser Thr Ile Asp Ile Gly Ala Val Tyr Gly Val Gly Phe		
2315	2320	2325

gtc acg agg gcc gag atg gag gag gac ttt gat gct atc cgt ttc
7029

Val Thr Arg Ala Glu Met Glu Glu Asp Phe Asp Ala Ile Arg Phe

2330

2335

2340

atg ttt gac tca gtt gaa gag cat gag ctg cac acg ctt ttc gcc
7074

Met Phe Asp Ser Val Glu Glu His Glu Leu His Thr Leu Phe Ala

2345

2350

2355

gaa gcg gtc gtg tct gac cag cgt gcc cgg cag caa cca cag cgc
7119

Glu Ala Val Val Ser Asp Gln Arg Ala Arg Gln Gln Pro Gln Arg

2360

2365

2370

aag acg gtc att gac atg gcg gac ctt gag ctt acc acg ggt atc
7164

Lys Thr Val Ile Asp Met Ala Asp Leu Glu Leu Thr Thr Gly Ile

2375

2380

2385

cca gat ctt gac cct gcg ctt caa gat cga att att tac ttc aac
7209

Pro Asp Leu Asp Pro Ala Leu Gln Asp Arg Ile Ile Tyr Phe Asn

2390

2395

2400

gac cct cgt ttc gga aac ttc aaa att ccc ggt caa cgc gga gac
7254

Asp Pro Arg Phe Gly Asn Phe Lys Ile Pro Gly Gln Arg Gly Asp

2405

2410

2415

ggg ggc gac aat gga tca ggg tct aaa ggc tcc att gcc gac cag
7299

Gly Gly Asp Asn Gly Ser Gly Ser Lys Gly Ser Ile Ala Asp Gln

2420

2425

2430

ctc aaa caa gca aca act tta gac caa gtt cgg caa atc gtg att
7344

Leu Lys Gln Ala Thr Thr Leu Asp Gln Val Arg Gln Ile Val Ile

2435

2440

2445

gat ggt cta tct gag aaa ctc cgt gtt acc ctc caa gtt tcg gac
7389

Asp Gly Leu Ser Glu Lys Leu Arg Val Thr Leu Gln Val Ser Asp

2450

2455

2460

ggg gag agc gtg gac cca acc att cct ctc att gat caa ggt gtc
7434

Gly Glu Ser Val Asp Pro Thr Ile Pro Leu Ile Asp Gln Gly Val

2465

2470

2475

gac tcc ttg ggt gca gtg act gtc ggc tca tgg ttc tca aag caa
7479

Asp Ser Leu Gly Ala Val Thr Val Gly Ser Trp Phe Ser Lys Gln

2480

2485

2490

ctc tac ctt gac ctc cca ctc ttg agg gta ctt ggc ggt gct tct
7524

Leu Tyr Leu Asp Leu Pro Leu Leu Arg Val Leu Gly Gly Ala Ser

2495

2500

2505

gtc gct gat ctt gcc gac gac gcg gcc acc cga ctc cca gct aca
7569

Val Ala Asp Leu Ala Asp Asp Ala Ala Thr Arg Leu Pro Ala Thr

2510

2515

2520

tcc att ccg ctg ctg ttg caa att ggt gat tcc acg gga acc tcg
7614

Ser Ile Pro Leu Leu Leu Gln Ile Gly Asp Ser Thr Gly Thr Ser

2525

2530

2535

gac agc ggg gct tct ccg aca cca aca gac agc cat gat gaa gca

7659
 Asp Ser Gly Ala Ser Pro Thr Pro Thr Asp Ser His Asp Glu Ala
 2540 2545 2550

 agc tct gct acc agc aca gat gcg tcg tca gcc gaa gag gat gaa
 7704
 Ser Ser Ala Thr Ser Thr Asp Ala Ser Ser Ala Glu Glu Asp Glu
 2555 2560 2565

 gag caa gag gac gat aat gag cag gga ggc cgt aag att ctt cgt
 7749
 Glu Gln Glu Asp Asp Asn Glu Gln Gly Gly Arg Lys Ile Leu Arg
 2570 2575 2580

 cgc gag agg ttg tcc ctt ggc cag gag tat tcc tgg agg cag caa
 7794
 Arg Glu Arg Leu Ser Leu Gly Gln Glu Tyr Ser Trp Arg Gln Gln
 2585 2590 2595

 caa atg gta aaa gat cat acc atc ttc aac aac act att ggc atg
 7839
 Gln Met Val Lys Asp His Thr Ile Phe Asn Asn Thr Ile Gly Met
 2600 2605 2610

 ttc atg aag ggt acc att gac ctc gac cgg ttg agg cgg gct ctg
 7884
 Phe Met Lys Gly Thr Ile Asp Leu Asp Arg Leu Arg Arg Ala Leu
 2615 2620 2625

 aaa gcc tca ttg cgc cgt cac gag atc ttc cgt acg tgc ttt gtt
 7929
 Lys Ala Ser Leu Arg Arg His Glu Ile Phe Arg Thr Cys Phe Val
 2630 2635 2640

 act ggc gat gac tat agc agc gat tta aat ggt ccc gtc caa gtg
 7974

Thr Gly	Asp Asp Tyr Ser Ser	Asp Leu Asn Gly Pro	Val Gln Val
2645	2650	2655	

gtt ctc 8019	aag aac ccg gag aac	aga gtg cac ttt gtt	cag gtg aac
Val Leu	Lys Asn Pro Glu Asn	Arg Val His Phe Val	Gln Val Asn
2660	2665	2670	

aac gct 8064	gcg gag gca gag gaa	gag tac cgg aaa ctc	gag aag aca
Asn Ala	Ala Glu Ala Glu Glu	Glu Tyr Arg Lys Leu	Glu Lys Thr
2675	2680	2685	

aac tat 8109	agc atc tcc aca ggt	gac act ctc aga ctc	gtt gat ttc
Asn Tyr	Ser Ile Ser Thr Gly	Asp Thr Leu Arg Leu	Val Asp Phe
2690	2695	2700	

tac tgg 8154	ggc aca gat gac cac	ctg ttg gta atc ggc	tac cac aga
Tyr Trp	Gly Thr Asp Asp His	Leu Leu Val Ile Gly	Tyr His Arg
2705	2710	2715	

tta gtt 8199	ggt gat ggc tca aca	aca gaa aac ctg ttc	aat gag atc
Leu Val	Gly Asp Gly Ser Thr	Thr Glu Asn Leu Phe	Asn Glu Ile
2720	2725	2730	

ggg cag 8244	att tac agc ggg gtg	aaa atg cag cga cca	tcg acc caa
Gly Gln	Ile Tyr Ser Gly Val	Lys Met Gln Arg Pro	Ser Thr Gln
2735	2740	2745	

ttc tct 8289	gat cta gcc gtc caa	cag cgg gaa aac ctg	gaa aat ggg
Phe Ser	Asp Leu Ala Val Gln	Gln Arg Glu Asn Leu	Glu Asn Gly

2750	2755	2760
cga atg 8334	ggg gac gat atc gcg	ttc tgg aag tcc atg cat agc aaa
Arg Met	Gly Asp Asp Ile Ala	Phe Trp Lys Ser Met His Ser Lys
2765	2770	2775
gtc tcg 8379	tca tct gcg cca acc	gtg ctt ccc atc atg aat ctg atc
Val Ser	Ser Ser Ala Pro Thr	Val Leu Pro Ile Met Asn Leu Ile
2780	2785	2790
aat gac 8424	cct gct gcc aat tca	gag cag cag caa ata cag cca ttc
Asn Asp	Pro Ala Ala Asn Ser	Glu Gln Gln Gln Ile Gln Pro Phe
2795	2800	2805
acg tgg 8469	cag cag tat gaa gca	att gct cgt tta gat ccc atg gtc
Thr Trp	Gln Gln Tyr Glu Ala	Ile Ala Arg Leu Asp Pro Met Val
2810	2815	2820
gcc ttc 8514	cga atc aaa gag cgg	agc cgc aag cac aag gca acc ccc
Ala Phe	Arg Ile Lys Glu Arg	Ser Arg Lys His Lys Ala Thr Pro
2825	2830	2835
atg cag 8559	ttc tac ctg gcc gcc	tac cac gtt ttg ttg gcg cgt ctt
Met Gln	Phe Tyr Leu Ala Ala	Tyr His Val Leu Leu Ala Arg Leu
2840	2845	2850
acc ggc 8604	agc aaa gac ata acc	atc ggc ctc gcc gaa acc aac cga
Thr Gly	Ser Lys Asp Ile Thr	Ile Gly Leu Ala Glu Thr Asn Arg

2855	2860	2865
tcc acc atg gaa gaa att tcg gcg atg ggc ttt ttc gct aac gtg 8649		
Ser Thr Met Glu Glu Ile Ser Ala Met Gly Phe Phe Ala Asn Val		
2870	2875	2880
ctt ccc ctg cgc ttt gat gag ttc gtc ggc agc aag aca ttc ggc 8694		
Leu Pro Leu Arg Phe Asp Glu Phe Val Gly Ser Lys Thr Phe Gly		
2885	2890	2895
gag cac ctt gta gcc acc aag gac agt gtg cgt gag gcc atg caa 8739		
Glu His Leu Val Ala Thr Lys Asp Ser Val Arg Glu Ala Met Gln		
2900	2905	2910
cac gcg cgg gtg ccg tat ggc gtc atc ctc gac tgt cta ggc ctg 8784		
His Ala Arg Val Pro Tyr Gly Val Ile Leu Asp Cys Leu Gly Leu		
2915	2920	2925
aat ctc cct acc tca ggc gag gaa ccc aag act cag aca cac gcc 8829		
Asn Leu Pro Thr Ser Gly Glu Glu Pro Lys Thr Gln Thr His Ala		
2930	2935	2940
ccc ttg ttc cag gct gtc ttt gat tac aag cag ggt caa gcg gag 8874		
Pro Leu Phe Gln Ala Val Phe Asp Tyr Lys Gln Gly Gln Ala Glu		
2945	2950	2955
agt ggc tca att ggc aat gcc aaa atg acg agt gtt ctc gct tcc 8919		
Ser Gly Ser Ile Gly Asn Ala Lys Met Thr Ser Val Leu Ala Ser		
2960	2965	2970

cgt gag cgc act cct tat gac atc gtt ctc gag atg tgg gat gac
8964

Arg Glu Arg Thr Pro Tyr Asp Ile Val Leu Glu Met Trp Asp Asp

2975

2980

2985

cct acc aag gac cca ctc att cat gtc aaa ctt cag agc tcg ctg
9009

Pro Thr Lys Asp Pro Leu Ile His Val Lys Leu Gln Ser Ser Leu

2990

2995

3000

tat ggc cct gag cac gct cag gcc ttt gta gac cac ttt tct tca
9054

Tyr Gly Pro Glu His Ala Gln Ala Phe Val Asp His Phe Ser Ser

3005

3010

3015

atc ctc act atg ttc tcg atg aac ccg gct ctg aag ttg gcc tag
9099

Ile Leu Thr Met Phe Ser Met Asn Pro Ala Leu Lys Leu Ala

3020

3025

3030

<210> 44

<211> 3032

<212> PRT

<213> Penicillium citrinum

<400> 44

Met Asp Gln Ala Asn Tyr Pro Asn Glu Pro Ile Val Val Val Gly Ser
1 5 10 15

Gly Cys Arg Phe Pro Gly Gly Val Asn Thr Pro Ser Lys Leu Trp Glu
20 25 30

Leu Leu Lys Glu Pro Arg Asp Val Gln Thr Lys Ile Pro Lys Glu Arg
35 40 45

Phe Asp Val Asp Thr Phe Tyr Ser Pro Asp Gly Thr His Pro Gly Arg
50 55 60

Thr Asn Ala Pro Phe Ala Tyr Leu Leu Gln Glu Asp Leu Arg Gly Phe
65 70 75 80

Asp Ala Ser Phe Phe Asn Ile Gln Ala Gly Glu Ala Glu Thr Ile Asp
85 90 95

Pro Gln Gln Arg Leu Leu Leu Glu Thr Val Tyr Glu Ala Val Ser Asn
100 105 110

Ala Gly Leu Arg Ile Gln Gly Leu Gln Gly Ser Ser Thr Ala Val Tyr
115 120 125

Val Gly Met Met Thr His Asp Tyr Glu Thr Ile Val Thr Arg Glu Leu
130 135 140

Asp Ser Ile Pro Thr Tyr Ser Ala Thr Gly Val Ala Val Ser Val Ala
145 150 155 160

Ser Asn Arg Val Ser Tyr Phe Phe Asp Trp His Gly Pro Ser Met Thr
165 170 175

Ile Asp Thr Ala Cys Ser Ser Ser Leu Ala Ala Val His Leu Ala Val
180 185 190

Gln Gln Leu Arg Thr Gly Glu Ser Thr Met Ala Val Ala Ala Gly Ala
195 200 205

Asn Leu Ile Leu Gly Pro Met Thr Phe Val Met Glu Ser Lys Leu Asn
210 215 220

Met Leu Ser Pro Asn Gly Arg Ser Arg Met Trp Asp Ala Ala Ala Asp
225 230 235 240

Gly Tyr Ala Arg Gly Glu Gly Val Cys Ser Ile Val Leu Lys Thr Leu
245 250 255

Ser Gln Ala Leu Arg Asp Gly Asp Ser Ile Glu Cys Val Ile Arg Glu
260 265 270

Thr Gly Ile Asn Gln Asp Gly Arg Thr Thr Gly Ile Thr Met Pro Asn
275 280 285

His Ser Ala Gln Glu Ala Leu Ile Arg Ala Thr Tyr Ala Lys Ala Gly
290 295 300

Leu Asp Ile Thr Asn Pro Gln Glu Arg Cys Gln Phe Phe Glu Ala His
305 310 315 320

Gly Thr Gly Thr Pro Ala Gly Asp Pro Gln Glu Ala Glu Ala Ile Ala
325 330 335

Thr Ala Phe Phe Gly His Lys Asp Gly Thr Ile Asp Ser Asp Gly Glu
340 345 350

Lys Asp Glu Leu Phe Val Gly Ser Ile Lys Thr Val Leu Gly His Thr
355 360 365

Glu Gly Thr Ala Gly Ile Ala Gly Leu Met Lys Ala Ser Phe Ala Val
370 375 380

Arg Asn Gly Val Ile Pro Pro Asn Leu Leu Phe Glu Lys Ile Ser Pro
385 390 395 400

Arg Val Ala Pro Phe Tyr Thr His Leu Lys Ile Ala Thr Glu Ala Thr
405 410 415

Glu Trp Pro Ile Val Ala Pro Gly Gln Pro Arg Arg Val Ser Val Asn
420 425 430

Ser Phe Gly Phe Gly Gly Thr Asn Ala His Ala Ile Ile Glu Glu Tyr

435

440

445

Met Ala Pro Pro His Lys Pro Thr Ala Val Val Thr Glu Val Thr Ser
 450 455 460

Asp Ala Asp Ala Cys Ser Leu Pro Leu Val Leu Ser Ser Lys Ser Gln
 465 470 475 480

Arg Ser Met Lys Ala Thr Leu Glu Asn Met Leu Gln Phe Leu Glu Thr
 485 490 495

His Asp Asp Val Asp Met His Asp Ile Ala Tyr Thr Leu Leu Glu Lys
 500 505 510

Arg Ser Ile Leu Pro Phe Arg Arg Ala Ile Ala Ala His Asn Lys Glu
 515 520 525

Val Ala Arg Ala Ala Leu Glu Ala Ala Ile Ala Asp Gly Glu Val Val
 530 535 540

Thr Asp Phe Arg Thr Asp Ala Asn Asp Asn Pro Arg Val Leu Gly Val
 545 550 555 560

Phe Thr Gly Gln Gly Ala Gln Trp Pro Gly Met Leu Lys Lys Leu Met
 565 570 575

Val Gly Met Pro Phe Val Arg Gly Ile Leu Glu Glu Leu Asp Asn Ser
 580 585 590

Leu Gln Thr Leu Pro Glu Lys Tyr Arg Pro Thr Trp Thr Leu Tyr Asp
 595 600 605

Gln Leu Met Leu Glu Gly Asp Ala Ser Asn Val Arg Leu Ala Ser Phe
 610 615 620

Ser Gln Pro Leu Cys Cys Ala Val Gln Ile Val Leu Val Arg Leu Leu
 625 630 635 640

Ala Ala Ala Gly Ile Glu Phe Ser Ala Ile Val Gly His Ser Ser Gly
645 650 655

Glu Ile Ala Cys Ala Phe Ala Ala Gly Phe Ile Ser Ala Thr Gln Ala
660 665 670

Ile Arg Ile Ala His Leu Arg Gly Val Val Ser Ala Glu His Ala Ser
675 680 685

Ser Pro Ser Gly Gln Thr Gly Ala Met Leu Ala Ala Gly Met Ser Tyr
690 695 700

Asp Asp Ala Lys Glu Leu Cys Glu Leu Glu Ala Phe Glu Gly Arg Val
705 710 715 720

Cys Val Ala Ala Ser Asn Ser Pro Asp Ser Val Thr Phe Ser Gly Asp
725 730 735

Met Asp Ala Ile Gln His Val Glu Gly Val Leu Glu Asp Glu Ser Thr
740 745 750

Phe Ala Arg Ile Leu Arg Val Asp Lys Ala Tyr His Ser His His Met
755 760 765

His Pro Cys Ala Ala Pro Tyr Val Lys Ala Leu Leu Glu Cys Asp Cys
770 775 780

Ala Val Ala Asp Gly Gln Gly Asn Asp Ser Val Ala Trp Phe Ser Ala
785 790 795 800

Val His Glu Thr Ser Lys Gln Met Thr Val Gln Asp Val Met Pro Ala
805 810 815

Tyr Trp Lys Asp Asn Leu Val Ser Pro Val Leu Phe Ser Gln Ala Val
820 825 830

Gln Lys Ala Val Ile Thr His Arg Leu Ile Asp Val Ala Ile Glu Ile
835 840 845

Gly Ala His Pro Ala Leu Lys Gly Pro Cys Leu Ala Thr Ile Lys Asp
850 855 860

Ala Leu Ala Gly Val Glu Leu Pro Tyr Thr Gly Cys Leu Ala Arg Asn
865 870 875 880

Val Asp Asp Val Asp Ala Phe Ala Gly Gly Leu Gly Tyr Ile Trp Glu
885 890 895

Arg Phe Gly Val Arg Ser Ile Asp Ala Glu Gly Phe Val Gln Gln Val
900 905 910

Arg Pro Asp Arg Ala Val Gln Asn Leu Ser Lys Ser Leu Pro Thr Tyr
915 920 925

Ser Trp Asp His Thr Arg Gln Tyr Trp Ala Glu Ser Arg Ser Thr Arg
930 935 940

Gln His Leu Arg Gly Gly Ala Pro His Leu Leu Leu Gly Lys Leu Ser
945 950 955 960

Ser Tyr Ser Thr Ala Ser Thr Phe Gln Trp Thr Asn Phe Ile Arg Pro
965 970 975

Arg Asp Leu Glu Trp Leu Asp Gly His Ala Leu Gln Gly Gln Thr Val
980 985 990

Phe Pro Ala Ala Gly Tyr Ile Ile Met Ala Met Glu Ala Ala Met Lys
995 1000 1005

Val Ala Gly Glu Arg Ala Ala Gln Val Gln Leu Leu Glu Ile Leu
1010 1015 1020

Asp Met Ser Ile Asn Lys Ala Ile Val Phe Glu Asp Glu Asn Thr
1025 1030 1035

Ser Val Glu Leu Asn Leu Thr Ala Glu Val Thr Ser Asp Asn Asp

1040		1045		1050
Ala Asp Gly Gln Val Thr Val Lys Phe Val Ile Asp Ser Cys Leu	1055	1060		1065
Ala Lys Glu Ser Glu Leu Ser Thr Ser Ala Lys Gly Gln Ile Val	1070	1075		1080
Ile Thr Leu Gly Glu Ala Ser Pro Ser Ser Gln Leu Leu Pro Pro	1085	1090		1095
Pro Glu Glu Glu Tyr Pro Gln Met Asn Asn Val Asn Ile Asp Phe	1100	1105		1110
Phe Tyr Arg Glu Leu Asp Leu Leu Gly Tyr Asp Tyr Ser Lys Asp	1115	1120		1125
Phe Arg Arg Leu Gln Thr Met Arg Arg Ala Asp Ser Lys Ala Ser	1130	1135		1140
Gly Thr Leu Ala Phe Leu Pro Leu Lys Asp Glu Leu Arg Asn Glu	1145	1150		1155
Pro Leu Leu Leu His Pro Ala Pro Leu Asp Ile Ala Phe Gln Thr	1160	1165		1170
Val Ile Gly Ala Tyr Ser Ser Pro Gly Asp Arg Arg Leu Arg Ser	1175	1180		1185
Leu Tyr Val Pro Thr His Val Asp Arg Val Thr Leu Ile Pro Ser	1190	1195		1200
Leu Cys Ile Ser Ala Gly Asn Ser Gly Glu Thr Glu Leu Ala Phe	1205	1210		1215
Asp Thr Ile Asn Thr His Asp Lys Gly Asp Phe Leu Ser Gly Asp	1220	1225		1230

Ile Thr Val Tyr Asp Ser Thr Lys Thr Thr Leu Phe Gln Val Asp
1235 1240 1245

Asn Ile Val Phe Lys Pro Phe Ser Pro Pro Thr Ala Ser Thr Asp
1250 1255 1260

His Arg Ile Phe Ala Lys Trp Val Trp Gly Pro Leu Thr Pro Glu
1265 1270 1275

Lys Leu Leu Glu Asp Pro Ala Thr Leu Ile Ile Ala Arg Asp Lys
1280 1285 1290

Glu Asp Ile Leu Thr Ile Glu Arg Ile Val Tyr Phe Tyr Ile Lys
1295 1300 1305

Ser Phe Leu Ala Gln Ile Thr Pro Asp Asp Arg Gln Asn Ala Asp
1310 1315 1320

Leu His Ser Gln Lys Tyr Ile Glu Trp Cys Asp Gln Val Gln Ala
1325 1330 1335

Asp Ala Arg Ala Gly His His Gln Trp Tyr Gln Glu Ser Trp Glu
1340 1345 1350

Glu Asp Thr Ser Val His Ile Glu Gln Met Cys Glu Ser Asn Ser
1355 1360 1365

Ser His Pro His Val Arg Leu Ile Gln Arg Val Gly Lys Glu Leu
1370 1375 1380

Ile Ser Ile Val Arg Gly Asn Gly Asp Pro Leu Asp Ile Met Asn
1385 1390 1395

Arg Asp Gly Leu Phe Thr Glu Tyr Tyr Thr Asn Lys Leu Ala Phe
1400 1405 1410

Gly Ser Ala Ile His Val Val Gln Asp Leu Val Ser Gln Ile Ala
1415 1420 1425

His Arg Tyr Gln Ser Ile Asp Ile Leu Glu Ile Gly Leu Gly Thr
1430 1435 1440

Gly Ile Ala Thr Lys Arg Val Leu Ala Ser Pro Gln Leu Gly Phe
1445 1450 1455

Asn Ser Tyr Thr Cys Thr Asp Ile Ser Ala Asp Val Ile Gly Lys
1460 1465 1470

Ala Arg Glu Gln Leu Ser Glu Phe Asp Gly Leu Met Gln Phe Glu
1475 1480 1485

Ala Leu Asp Ile Asn Arg Ser Pro Ala Glu Gln Gly Phe Lys Pro
1490 1495 1500

His Ser Tyr Asp Leu Ile Ile Ala Ser Asp Val Leu His Ala Ser
1505 1510 1515

Ser Asn Phe Glu Glu Lys Leu Ala His Ile Arg Ser Leu Leu Lys
1520 1525 1530

Pro Gly Gly His Leu Val Thr Phe Gly Val Thr His Arg Glu Pro
1535 1540 1545

Ala Arg Leu Ala Phe Ile Ser Gly Leu Phe Ala Asp Arg Trp Thr
1550 1555 1560

Gly Glu Asp Glu Thr Arg Ala Leu Ser Ala Ser Gly Ser Val Asp
1565 1570 1575

Gln Trp Glu His Thr Leu Lys Arg Val Gly Phe Ser Gly Val Asp
1580 1585 1590

Ser Arg Thr Leu Asp Arg Glu Asp Asp Leu Ile Pro Ser Val Phe
1595 1600 1605

Ser Thr His Ala Val Asp Ala Thr Val Glu Arg Leu Tyr Asp Pro

1610		1615		1620
Leu Ser Ala Pro Leu Lys Asp Ser Tyr Pro Pro Leu Val Val Ile	1625	1630		1635
Gly Gly Glu Ser Thr Lys Thr Glu Arg Ile Leu Asn Asp Met Lys	1640	1645		1650
Ala Ala Leu Pro His Arg His Ile His Ser Val Lys Arg Leu Glu	1655	1660		1665
Ser Val Leu Asp Asp Pro Ala Leu Gln Pro Lys Ser Thr Phe Val	1670	1675		1680
Ile Leu Ser Glu Leu Asp Asp Glu Val Phe Cys Asn Leu Glu Glu	1685	1690		1695
Asp Lys Phe Glu Ala Val Lys Ser Leu Leu Phe Tyr Ala Gly Arg	1700	1705		1710
Met Met Trp Leu Thr Glu Asn Ala Trp Ile Asp His Pro His Gln	1715	1720		1725
Ala Ser Thr Ile Gly Met Leu Arg Thr Ile Lys Leu Glu Asn Pro	1730	1735		1740
Asp Leu Gly Thr His Val Phe Asp Val Asp Thr Val Glu Asn Leu	1745	1750		1755
Asp Thr Lys Phe Phe Val Glu Gln Leu Leu Arg Phe Glu Glu Ser	1760	1765		1770
Asp Asp Gln Leu Leu Glu Ser Ile Thr Trp Thr His Glu Pro Glu	1775	1780		1785
Val Tyr Trp Cys Lys Gly Arg Ala Trp Val Pro Arg Leu Lys Gln	1790	1795		1800

Asp Ile Ala Arg Asn Asp Arg Met Asn Ser Ser Arg Arg Pro Ile
1805 1810 1815

Phe Gly Asn Phe Asn Ser Ser Lys Thr Ala Ile Ala Leu Lys Glu
1820 1825 1830

Ala Arg Gly Ala Ser Ser Ser Met Tyr Tyr Leu Glu Ser Thr Glu
1835 1840 1845

Thr Cys Asp Ser Leu Glu Asp Ala Arg His Ala Gly Lys Ala Thr
1850 1855 1860

Val Arg Val Arg Tyr Ala Leu Pro Gln Ala Ile Arg Val Gly His
1865 1870 1875

Leu Gly Tyr Phe His Val Val Gln Gly Ser Ile Leu Glu Asn Thr
1880 1885 1890

Cys Glu Val Pro Val Val Ala Leu Ala Glu Lys Asn Gly Ser Ile
1895 1900 1905

Leu His Val Pro Arg Asn Tyr Met His Ser Leu Pro Asp Asn Met
1910 1915 1920

Ala Glu Gly Glu Asp Ser Ser Phe Leu Leu Ser Thr Ala Ala Ala
1925 1930 1935

Leu Leu Ala Glu Thr Ile Leu Ser Ser Ala Gln Ser Phe Gly Ser
1940 1945 1950

Asp Ala Ser Ile Leu Ile Met Glu Pro Pro Ile Phe Cys Val Lys
1955 1960 1965

Ala Ile Leu Glu Ser Ala Lys Thr Tyr Gly Val Gln Val His Leu
1970 1975 1980

Ala Thr Thr Leu Ser Asp Val Lys Thr Ile Pro Ala Pro Trp Ile
1985 1990 1995

Arg Leu His Ala Lys Glu Thr Asp Ala Arg Leu Lys His Ser Leu
2000 2005 2010

Pro Thr Asn Met Met Ala Phe Phe Asp Leu Ser Thr Asp Arg Thr
2015 2020 2025

Ala Ala Gly Ile Thr Asn Arg Leu Ala Lys Leu Leu Pro Pro Ser
2030 2035 2040

Cys Phe Met Tyr Ser Gly Asp Tyr Leu Ile Arg Ser Thr Ala Ser
2045 2050 2055

Thr Tyr Lys Val Ser His Val Glu Asp Ile Pro Ile Leu Glu His
2060 2065 2070

Ser Val Ala Met Ala Lys Asn Thr Val Ser Ala Ser Thr Val Asp
2075 2080 2085

Asp Thr Glu Lys Val Ile Thr Ala Thr Gln Ile Leu Leu Pro Gly
2090 2095 2100

Gln Leu Ser Val Asn His Asn Asp Gln Arg Phe Asn Leu Ala Thr
2105 2110 2115

Val Ile Asp Trp Lys Glu Asn Glu Val Ser Ala Arg Ile Cys Pro
2120 2125 2130

Ile Asp Ser Gly Asn Leu Phe Ser Asn Lys Lys Thr Tyr Leu Leu
2135 2140 2145

Val Gly Leu Thr Gly Asp Leu Gly Arg Ser Leu Cys Arg Trp Met
2150 2155 2160

Ile Leu His Gly Ala Arg His Val Val Leu Thr Ser Arg Asn Pro
2165 2170 2175

Arg Leu Asp Pro Lys Trp Ile Ala Asn Met Glu Ala Leu Gly Gly

2180		2185		2190
Asp Ile Thr Val Leu Ser Met	Asp Val Ala Asn Glu	Asp Ser Val		
2195	2200	2205		
Asp Ala Gly Leu Gly Lys Leu	Val Asp Met Lys Leu	Pro Pro Val		
2210	2215	2220		
Ala Gly Ile Ala Phe Gly Pro	Leu Val Leu Gln Asp	Val Met Leu		
2225	2230	2235		
Lys Asn Met Asp His Gln Met	Met Asp Met Val Leu	Lys Pro Lys		
2240	2245	2250		
Val Gln Gly Ala Arg Ile Leu	His Glu Arg Phe Ser	Glu Gln Thr		
2255	2260	2265		
Gly Ser Lys Ala Leu Asp Phe	Phe Ile Met Phe Ser	Ser Ile Val		
2270	2275	2280		
Ala Val Ile Gly Asn Pro Gly	Gln Ser Asn Tyr Gly	Ala Ala Asn		
2285	2290	2295		
Ala Tyr Leu Gln Ala Leu Ala	Gln Gln Arg Cys Ala	Arg Gly Leu		
2300	2305	2310		
Ala Gly Ser Thr Ile Asp Ile	Gly Ala Val Tyr Gly	Val Gly Phe		
2315	2320	2325		
Val Thr Arg Ala Glu Met Glu	Glu Asp Phe Asp Ala	Ile Arg Phe		
2330	2335	2340		
Met Phe Asp Ser Val Glu Glu	His Glu Leu His Thr	Leu Phe Ala		
2345	2350	2355		
Glu Ala Val Val Ser Asp Gln	Arg Ala Arg Gln Gln	Pro Gln Arg		
2360	2365	2370		

Lys Thr Val Ile Asp Met Ala Asp Leu Glu Leu Thr Thr Gly Ile
2375 2380 2385

Pro Asp Leu Asp Pro Ala Leu Gln Asp Arg Ile Ile Tyr Phe Asn
2390 2395 2400

Asp Pro Arg Phe Gly Asn Phe Lys Ile Pro Gly Gln Arg Gly Asp
2405 2410 2415

Gly Gly Asp Asn Gly Ser Gly Ser Lys Gly Ser Ile Ala Asp Gln
2420 2425 2430

Leu Lys Gln Ala Thr Thr Leu Asp Gln Val Arg Gln Ile Val Ile
2435 2440 2445

Asp Gly Leu Ser Glu Lys Leu Arg Val Thr Leu Gln Val Ser Asp
2450 2455 2460

Gly Glu Ser Val Asp Pro Thr Ile Pro Leu Ile Asp Gln Gly Val
2465 2470 2475

Asp Ser Leu Gly Ala Val Thr Val Gly Ser Trp Phe Ser Lys Gln
2480 2485 2490

Leu Tyr Leu Asp Leu Pro Leu Leu Arg Val Leu Gly Gly Ala Ser
2495 2500 2505

Val Ala Asp Leu Ala Asp Asp Ala Ala Thr Arg Leu Pro Ala Thr
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Ser Ile Pro Leu Leu Leu Gln Ile Gly Asp Ser Thr Gly Thr Ser
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Asp Ser Gly Ala Ser Pro Thr Pro Thr Asp Ser His Asp Glu Ala
2540 2545 2550

Ser Ser Ala Thr Ser Thr Asp Ala Ser Ser Ala Glu Glu Asp Glu
2555 2560 2565

Glu Gln Glu Asp Asp Asn Glu Gln Gly Gly Arg Lys Ile Leu Arg
2570 2575 2580

Arg Glu Arg Leu Ser Leu Gly Gln Glu Tyr Ser Trp Arg Gln Gln
2585 2590 2595

Gln Met Val Lys Asp His Thr Ile Phe Asn Asn Thr Ile Gly Met
2600 2605 2610

Phe Met Lys Gly Thr Ile Asp Leu Asp Arg Leu Arg Arg Ala Leu
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Lys Ala Ser Leu Arg Arg His Glu Ile Phe Arg Thr Cys Phe Val
2630 2635 2640

Thr Gly Asp Asp Tyr Ser Ser Asp Leu Asn Gly Pro Val Gln Val
2645 2650 2655

Val Leu Lys Asn Pro Glu Asn Arg Val His Phe Val Gln Val Asn
2660 2665 2670

Asn Ala Ala Glu Ala Glu Glu Glu Tyr Arg Lys Leu Glu Lys Thr
2675 2680 2685

Asn Tyr Ser Ile Ser Thr Gly Asp Thr Leu Arg Leu Val Asp Phe
2690 2695 2700

Tyr Trp Gly Thr Asp Asp His Leu Leu Val Ile Gly Tyr His Arg
2705 2710 2715

Leu Val Gly Asp Gly Ser Thr Thr Glu Asn Leu Phe Asn Glu Ile
2720 2725 2730

Gly Gln Ile Tyr Ser Gly Val Lys Met Gln Arg Pro Ser Thr Gln
2735 2740 2745

Phe Ser Asp Leu Ala Val Gln Gln Arg Glu Asn Leu Glu Asn Gly

2750		2755		2760
Arg Met Gly Asp Asp Ile Ala Phe Trp Lys Ser Met His Ser Lys	2765	2770		2775
Val Ser Ser Ser Ala Pro Thr Val Leu Pro Ile Met Asn Leu Ile	2780	2785		2790
Asn Asp Pro Ala Ala Asn Ser Glu Gln Gln Gln Ile Gln Pro Phe	2795	2800		2805
Thr Trp Gln Gln Tyr Glu Ala Ile Ala Arg Leu Asp Pro Met Val	2810	2815		2820
Ala Phe Arg Ile Lys Glu Arg Ser Arg Lys His Lys Ala Thr Pro	2825	2830		2835
Met Gln Phe Tyr Leu Ala Ala Tyr His Val Leu Leu Ala Arg Leu	2840	2845		2850
Thr Gly Ser Lys Asp Ile Thr Ile Gly Leu Ala Glu Thr Asn Arg	2855	2860		2865
Ser Thr Met Glu Glu Ile Ser Ala Met Gly Phe Phe Ala Asn Val	2870	2875		2880
Leu Pro Leu Arg Phe Asp Glu Phe Val Gly Ser Lys Thr Phe Gly	2885	2890		2895
Glu His Leu Val Ala Thr Lys Asp Ser Val Arg Glu Ala Met Gln	2900	2905		2910
His Ala Arg Val Pro Tyr Gly Val Ile Leu Asp Cys Leu Gly Leu	2915	2920		2925
Asn Leu Pro Thr Ser Gly Glu Glu Pro Lys Thr Gln Thr His Ala	2930	2935		2940

Pro Leu Phe Gln Ala Val Phe Asp Tyr Lys Gln Gly Gln Ala Glu
2945 2950 2955

Ser Gly Ser Ile Gly Asn Ala Lys Met Thr Ser Val Leu Ala Ser
2960 2965 2970

Arg Glu Arg Thr Pro Tyr Asp Ile Val Leu Glu Met Trp Asp Asp
2975 2980 2985

Pro Thr Lys Asp Pro Leu Ile His Val Lys Leu Gln Ser Ser Leu
2990 2995 3000

Tyr Gly Pro Glu His Ala Gln Ala Phe Val Asp His Phe Ser Ser
3005 3010 3015

Ile Leu Thr Met Phe Ser Met Asn Pro Ala Leu Lys Leu Ala
3020 3025 3030

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<220>

<221> CDS

<222> (1)..(7692)

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Met Asn Asn Thr Pro Ala Val Thr Ala Thr Ala Thr Ala Thr

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10

15

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96
Ala Thr Ala Met Ala Gly Ser Ala Cys Ser Asn Thr Ser Thr Pro Ile

20

25

30

gcc ata gtt gga atg gga tgt cga ttt gct gga gat gca acg agt cca
144
Ala Ile Val Gly Met Gly Cys Arg Phe Ala Gly Asp Ala Thr Ser Pro

35

40

45

cag aag ctt tgg gaa atg gtt gaa aga gga ggc agt gcc tgg tct aag
192
Gln Lys Leu Trp Glu Met Val Glu Arg Gly Gly Ser Ala Trp Ser Lys

50

55

60

gtc ccc tcc tcg cga ttc aat gtg aga gga gta tac cac ccg aat ggc
240
Val Pro Ser Ser Arg Phe Asn Val Arg Gly Val Tyr His Pro Asn Gly

65

70

75

80

gaa agg gtc ggg tcc acc cac gta aag ggt gga cac ttc atc gac gag
288
Glu Arg Val Gly Ser Thr His Val Lys Gly Gly His Phe Ile Asp Glu

85

90

95

gat cct gct tta ttt gac gcc gcg ttc ttc aac atg acc aca gag gtc
336
Asp Pro Ala Leu Phe Asp Ala Ala Phe Phe Asn Met Thr Thr Glu Val

100

105

110

gcc agc tgc atg gat ccg cag tat cgg ctt atg ctt gag gtg gtc tac
384
Ala Ser Cys Met Asp Pro Gln Tyr Arg Leu Met Leu Glu Val Val Tyr

115

120

125

gaa tcg ctg gag agt gcc ggt atc acc atc gat ggt atg gca ggc tct

432
Glu Ser Leu Glu Ser Ala Gly Ile Thr Ile Asp Gly Met Ala Gly Ser
130 135 140

aat acg tcg gtg ttt ggg ggt gtc atg tac cac gac tat cag gat tcg
480
Asn Thr Ser Val Phe Gly Gly Val Met Tyr His Asp Tyr Gln Asp Ser
145 150 155 160

ctc aat cgt gac ccc gag aca gtt ccg cgt tat ttc ata act ggc aac
528
Leu Asn Arg Asp Pro Glu Thr Val Pro Arg Tyr Phe Ile Thr Gly Asn
165 170 175

tca gga aca atg ctt tcg aac cgg ata tca cac ttc tac gac tta cgt
576
Ser Gly Thr Met Leu Ser Asn Arg Ile Ser His Phe Tyr Asp Leu Arg
180 185 190

ggt ccc agc gtg acg gtt gac acg gcc tgt tcg acg aca ttg acc gca
624
Gly Pro Ser Val Thr Val Asp Thr Ala Cys Ser Thr Thr Leu Thr Ala
195 200 205

ctg cac ttg gcg tgc cag agc tta cgt act ggg gag tca gat aca gcc
672
Leu His Leu Ala Cys Gln Ser Leu Arg Thr Gly Glu Ser Asp Thr Ala
210 215 220

atc gtt atc ggt gca aat ctt ctg ctc aat ccc gat gtt ttt gtt acg
720
Ile Val Ile Gly Ala Asn Leu Leu Leu Asn Pro Asp Val Phe Val Thr
225 230 235 240

atg tca aac ctg gga ttt ttg tcc ccg gat ggt atc tcg tac tct ttt
768

Met Ser Asn Leu Gly Phe Leu Ser Pro Asp Gly Ile Ser Tyr Ser Phe
245 250 255

gat cct cga gcg aat gga tat ggt cgc ggg gaa gga att gcc gct ctg
816
Asp Pro Arg Ala Asn Gly Tyr Gly Arg Gly Glu Gly Ile Ala Ala Leu
260 265 270

gta ata aag gcc ctc cct aac gcg ttg cga gac caa gac cct atc cga
864
Val Ile Lys Ala Leu Pro Asn Ala Leu Arg Asp Gln Asp Pro Ile Arg
275 280 285

gcc gtc att cga gag aca gcg ctg aac cag gat ggc aaa aca ccc gca
912
Ala Val Ile Arg Glu Thr Ala Leu Asn Gln Asp Gly Lys Thr Pro Ala
290 295 300

att act gcg ccg agt gat gtg gcg cag aaa agt ctg atc cag gag tgt
960
Ile Thr Ala Pro Ser Asp Val Ala Gln Lys Ser Leu Ile Gln Glu Cys
305 310 315 320

tac gat aag gct ggg cta gat atg tcg ttg acc tcg tac gtg gag gcc
1008
Tyr Asp Lys Ala Gly Leu Asp Met Ser Leu Thr Ser Tyr Val Glu Ala
325 330 335

cac gga act gga aca cca act ggt gac ccc ctt gaa atc tca gca att
1056
His Gly Thr Gly Thr Pro Thr Gly Asp Pro Leu Glu Ile Ser Ala Ile
340 345 350

tca gca gct ttt aaa gga cat cct ctg cac ctt ggc tct gtg aaa gca
1104
Ser Ala Ala Phe Lys Gly His Pro Leu His Leu Gly Ser Val Lys Ala

355	360	365
aat att ggc cat aca gaa gcc gcc agt ggc ctg gcc agt ata atc aag		
1152		
Asn Ile Gly His Thr Glu Ala Ala Ser Gly Leu Ala Ser Ile Ile Lys		
370	375	380
gtg gcc ttg gcc ttg gag aag ggc ttg att ccc cct aat gcg cgg ttc		
1200		
Val Ala Leu Ala Leu Glu Lys Gly Leu Ile Pro Pro Asn Ala Arg Phe		
385	390	395
ctg caa aag aac agc aag ctg atg ctt gac caa aag aac atc aag atc		
1248		
Leu Gln Lys Asn Ser Lys Leu Met Leu Asp Gln Lys Asn Ile Lys Ile		
405	410	415
ccc atg tct gct caa gac tgg cct gtg aaa gat ggg act cgt cgc gca		
1296		
Pro Met Ser Ala Gln Asp Trp Pro Val Lys Asp Gly Thr Arg Arg Ala		
420	425	430
tct gtc aat aac ttc ggc ttt ggt ggt tcg aat gct cac gtc att ttg		
1344		
Ser Val Asn Asn Phe Gly Phe Gly Gly Ser Asn Ala His Val Ile Leu		
435	440	445
gaa tca tat gat cgc gca tca ttg gcc ctg cca gag gat caa gtg cat		
1392		
Glu Ser Tyr Asp Arg Ala Ser Leu Ala Leu Pro Glu Asp Gln Val His		
450	455	460
gtc aat ggt aac tct gag cat ggt agg gtt gag gat ggt tcc aaa cag		
1440		
Val Asn Gly Asn Ser Glu His Gly Arg Val Glu Asp Gly Ser Lys Gln		

465 470 475 480

agc cgc ata tac gtt gtg cgt gcc aag gac gag caa gct tgt cgg cga
1488

Ser Arg Ile Tyr Val Val Arg Ala Lys Asp Glu Gln Ala Cys Arg Arg

485 490 495

acg ata gca agc ctg cga gac tac att aaa tcc gtc gct gac att gac
1536

Thr Ile Ala Ser Leu Arg Asp Tyr Ile Lys Ser Val Ala Asp Ile Asp

500 505 510

ggg gaa ccc ttc ctc gcc agc ctc gcc tat aca cta ggc tct cgc cgt
1584

Gly Glu Pro Phe Leu Ala Ser Leu Ala Tyr Thr Leu Gly Ser Arg Arg

515 520 525

tcc att ctg cca tgg acg tca gtg tat gta gca gac agc ctt ggc ggc
1632

Ser Ile Leu Pro Trp Thr Ser Val Tyr Val Ala Asp Ser Leu Gly Gly

530 535 540

ctt gtt tct gcc ctc agc gat gag tcc aat caa cca aaa cga gcg aat
1680

Leu Val Ser Ala Leu Ser Asp Glu Ser Asn Gln Pro Lys Arg Ala Asn

545 550 555 560

gag aaa gta cgg ctc gga ttt gta ttc acc ggt cag ggg gcg cag tgg
1728

Glu Lys Val Arg Leu Gly Phe Val Phe Thr Gly Gln Gly Ala Gln Trp

565 570 575

cat gca atg ggc aga gag ctg gtc aat aca ttc cca gta ttc aaa cag
1776

His Ala Met Gly Arg Glu Leu Val Asn Thr Phe Pro Val Phe Lys Gln

580 585 590

gcg att ctt gaa tgt gat ggc tac atc aag caa ctg ggc gcg agt tgg
1824

Ala Ile Leu Glu Cys Asp Gly Tyr Ile Lys Gln Leu Gly Ala Ser Trp

595

600

605

aat ttt atg gag gag ctc cac cgt gat gag ctg acg act cgg gta aat
1872

Asn Phe Met Glu Glu Leu His Arg Asp Glu Leu Thr Thr Arg Val Asn

610

615

620

gat gcc gaa tac agt cta cca ctg tca acc gct atc caa att gca ctt
1920

Asp Ala Glu Tyr Ser Leu Pro Leu Ser Thr Ala Ile Gln Ile Ala Leu

625

630

635

640

gtg cgt ctc ctt tgg tca tgg gga att cgg cca acg ggg ata acc agt
1968

Val Arg Leu Leu Trp Ser Trp Gly Ile Arg Pro Thr Gly Ile Thr Ser

645

650

655

cac tca agt gga gag gct gct gct gcc tac gca gct ggg gct tta tcc
2016

His Ser Ser Gly Glu Ala Ala Ala Tyr Ala Ala Gly Ala Leu Ser

660

665

670

gcg cgg tcg gcc att ggg atc act tat ata cgc ggt gta ttg acc act
2064

Ala Arg Ser Ala Ile Gly Ile Thr Tyr Ile Arg Gly Val Leu Thr Thr

675

680

685

aag ccc aag ccc gca ttg gca gcc aaa gga gga atg atg gcg gtg ggt
2112

Lys Pro Lys Pro Ala Leu Ala Ala Lys Gly Gly Met Met Ala Val Gly

690

695

700

ctt ggt cgc agt gag acc aat gtt tac att tcg cgt ctc aac cag gag
2160

Leu Gly Arg Ser Glu Thr Asn Val Tyr Ile Ser Arg Leu Asn Gln Glu

705 710 715 720

gac ggc tgt gtg gtg gtt gga tgt atc aac agt caa tgt agt gtg acg
2208

Asp Gly Cys Val Val Val Gly Cys Ile Asn Ser Gln Cys Ser Val Thr

725 730 735

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2256

Val Ser Gly Asp Leu Gly Ala Ile Glu Lys Leu Glu Lys Leu Leu His

740 745 750

gcc gat ggc atc ttt acc agg aaa ctg aaa gtc act gaa gcc ttc cat
2304

Ala Asp Gly Ile Phe Thr Arg Lys Leu Lys Val Thr Glu Ala Phe His

755 760 765

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2352

Ser Ser His Met Arg Pro Met Ala Asp Ala Phe Gly Ala Ser Leu Arg

770 775 780

gat ctg ttc aac tcg gat aac aac aac gac aat ccc aat gct gac acc
2400

Asp Leu Phe Asn Ser Asp Asn Asn Asn Asp Asn Pro Asn Ala Asp Thr

785 790 795 800

tca aag ggt gta tta tat tca tca cct aag act ggt agt cgc atg acc
2448

Ser Lys Gly Val Leu Tyr Ser Ser Pro Lys Thr Gly Ser Arg Met Thr

805 810 815

gat ctt aaa ttg cta ttg gat ccc aca cac tgg atg gat agt atg cta

2496
Asp Leu Lys Leu Leu Leu Asp Pro Thr His Trp Met Asp Ser Met Leu
820 825 830

cag ccg gta gag ttc gag tcc tca ctc cgc gag atg tgc ttt gat ccc
2544
Gln Pro Val Glu Phe Glu Ser Ser Leu Arg Glu Met Cys Phe Asp Pro
835 840 845

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2592
Asn Thr Lys Glu Lys Ala Val Asp Val Ile Ile Glu Ile Gly Pro His
850 855 860

gga gcg ctt ggt ggt cca atc aac caa gtc atg cag gat ctg ggt ctg
2640
Gly Ala Leu Gly Gly Pro Ile Asn Gln Val Met Gln Asp Leu Gly Leu
865 870 875 880

aaa gga aca gat ata aac tat ctc agt tgc ctt tct cgc ggc aga agc
2688
Lys Gly Thr Asp Ile Asn Tyr Leu Ser Cys Leu Ser Arg Gly Arg Ser
885 890 895

tcg ttg gag aca atg tat cgt gct gct acg gag ttg ata agc aag ggt
2736
Ser Leu Glu Thr Met Tyr Arg Ala Ala Thr Glu Leu Ile Ser Lys Gly
900 905 910

tat ggg ctc aaa atg gac gct ata aac ttt cct cat gga aga aaa gag
2784
Tyr Gly Leu Lys Met Asp Ala Ile Asn Phe Pro His Gly Arg Lys Glu
915 920 925

ccc aga gtg aag gta ctg agc gat ttg ccg gcg tac ccg tgg aat cac
2832

Pro Arg Val Lys Val Leu Ser Asp Leu Pro Ala Tyr Pro Trp Asn His

930

935

940

caa acc cgt tat tgg aga gag cct cgc ggc agt cgt gag tcc aaa cag

2880

Gln Thr Arg Tyr Trp Arg Glu Pro Arg Gly Ser Arg Glu Ser Lys Gln

945

950

955

960

aga acc cat ccg cct cac act ttg ata ggc tca cgg gaa tct ctc tct

2928

Arg Thr His Pro Pro His Thr Leu Ile Gly Ser Arg Glu Ser Leu Ser

965

970

975

cct cat ttc gcg cct aaa tgg aaa cat gtt ctc cgt ctg tca gat att

2976

Pro His Phe Ala Pro Lys Trp Lys His Val Leu Arg Leu Ser Asp Ile

980

985

990

cca tgg ata cga gat cac gtc gtt ggt tcg agc atc atc ttt ccg gga

3024

Pro Trp Ile Arg Asp His Val Val Gly Ser Ser Ile Ile Phe Pro Gly

995

1000

1005

gct ggc ttc atc agc atg gcc atc gag ggg ttt tca caa gtc tgc

3069

Ala Gly Phe Ile Ser Met Ala Ile Glu Gly Phe Ser Gln Val Cys

1010

1015

1020

cca cca gtt gcg ggg gct agc atc aac tac aac ttg cgt gac gtt

3114

Pro Pro Val Ala Gly Ala Ser Ile Asn Tyr Asn Leu Arg Asp Val

1025

1030

1035

gaa ctc gcg cag gct ctc ata ata ccc gct gat gca gaa gca gag

3159

Glu Leu Ala Gln Ala Leu Ile Ile Pro Ala Asp Ala Glu Ala Glu

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Val Asp Leu Arg Leu Thr Ile	Arg Ser Cys Glu Glu	Arg Ser Leu
1055	1060	1065
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Gly Thr Lys Asn Trp His Gln	Phe Ser Val His Ser	Ile Ser Gly
1070	1075	1080
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Glu Asn Asn Thr Trp Thr Glu	His Cys Thr Gly Leu	Ile Arg Ser
1085	1090	1095
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Glu Ser Glu Arg Ser His Leu	Asp Cys Ser Thr Val	Glu Ala Ser
1100	1105	1110
cgc agg ttg aat cta ggc tca 3384	gat aac cgg agc att	gat ccc aac
Arg Arg Leu Asn Leu Gly Ser	Asp Asn Arg Ser Ile	Asp Pro Asn
1115	1120	1125
gat ctc tgg gag tcc tta cac 3429	gcg aat ggg ata tgc	cac gga ccc
Asp Leu Trp Glu Ser Leu His	Ala Asn Gly Ile Cys	His Gly Pro
1130	1135	1140
att ttt cag aac att cag cga 3474	att caa aac aat gga	cag ggc tcg
Ile Phe Gln Asn Ile Gln Arg	Ile Gln Asn Asn Gly	Gln Gly Ser

1145	1150	1155
ttt tgc aga ttt tcc att gct gac act gcc tcg gct atg cct cac 3519		
Phe Cys Arg Phe Ser Ile Ala Asp Thr Ala Ser Ala Met Pro His		
1160	1165	1170
tcg tac gag aat cga cac atc gtc cat cct act act ctg gac tcg 3564		
Ser Tyr Glu Asn Arg His Ile Val His Pro Thr Thr Leu Asp Ser		
1175	1180	1185
gtg atc cag gcg gca tac acg gtg tta ccc tac gcg gga aca cgt 3609		
Val Ile Gln Ala Ala Tyr Thr Val Leu Pro Tyr Ala Gly Thr Arg		
1190	1195	1200
atg aaa acg gcc atg gta cca agg agg cta aga aat gtc aaa ata 3654		
Met Lys Thr Ala Met Val Pro Arg Arg Leu Arg Asn Val Lys Ile		
1205	1210	1215
tcc tct agc ctg gct gac ttg gag gct ggt gat gct ctg gac gca 3699		
Ser Ser Ser Leu Ala Asp Leu Glu Ala Gly Asp Ala Leu Asp Ala		
1220	1225	1230
cag gcc agc atc aag gat cgc aac tct caa tcc ttc tct acc gac 3744		
Gln Ala Ser Ile Lys Asp Arg Asn Ser Gln Ser Phe Ser Thr Asp		
1235	1240	1245
ttg gca gtg ttt gat gac tat gat agc ggt tct tct ccc tcg gac 3789		
Leu Ala Val Phe Asp Asp Tyr Asp Ser Gly Ser Ser Pro Ser Asp		
1250	1255	1260

gga atc cca gtc ata gag att gaa ggc ctt gtt ttc cag tcg gtt
3834

Gly Ile Pro Val Ile Glu Ile Glu Gly Leu Val Phe Gln Ser Val

1265

1270

1275

gga agc agc ttc tct gac caa aag tca gac tcc aac gac aca gaa
3879

Gly Ser Ser Phe Ser Asp Gln Lys Ser Asp Ser Asn Asp Thr Glu

1280

1285

1290

aat gcc tgc agc tcc tgg gtt tgg gcc cct gac atc agc ttg ggt
3924

Asn Ala Cys Ser Ser Trp Val Trp Ala Pro Asp Ile Ser Leu Gly

1295

1300

1305

gac tcc act tgg ctc aaa gaa aag ttg agc act gag gct gag acg
3969

Asp Ser Thr Trp Leu Lys Glu Lys Leu Ser Thr Glu Ala Glu Thr

1310

1315

1320

aaa gaa acg gaa ctc atg atg gac ctc cga aga tgc acg atc aac
4014

Lys Glu Thr Glu Leu Met Met Asp Leu Arg Arg Cys Thr Ile Asn

1325

1330

1335

ttt ata cag gag gct gtc act gat ttg aca aat tct gat atc caa
4059

Phe Ile Gln Glu Ala Val Thr Asp Leu Thr Asn Ser Asp Ile Gln

1340

1345

1350

cat ctg gat ggc cac ctt cag aag tat ttc gat tgg atg aat gtc
4104

His Leu Asp Gly His Leu Gln Lys Tyr Phe Asp Trp Met Asn Val

1355

1360

1365

caa ttg gac ctt gcg aga caa aac aag ctc agc cca gcc agt tgc
 4149
 Gln Leu Asp Leu Ala Arg Gln Asn Lys Leu Ser Pro Ala Ser Cys

1370 1375 1380

gac tgg cta agt gac gat gct gag cag aag aaa tgc cta cag gcc
 4194
 Asp Trp Leu Ser Asp Asp Ala Glu Gln Lys Lys Cys Leu Gln Ala

1385 1390 1395

aga gtc gct gga gaa agc gtc aat ggc gag atg att tct cgt cta
 4239
 Arg Val Ala Gly Glu Ser Val Asn Gly Glu Met Ile Ser Arg Leu

1400 1405 1410

gga cct cag tta ata gca atg cta cgc cgc gaa aca gag cca ctt
 4284
 Gly Pro Gln Leu Ile Ala Met Leu Arg Arg Glu Thr Glu Pro Leu

1415 1420 1425

gag ttg atg atg caa gat cag ctg cta agc aga tac tac gtc aac
 4329
 Glu Leu Met Met Gln Asp Gln Leu Leu Ser Arg Tyr Tyr Val Asn

1430 1435 1440

gca atc aaa tgg agc cga tca aac gca caa gcc agc gag ctg atc
 4374
 Ala Ile Lys Trp Ser Arg Ser Asn Ala Gln Ala Ser Glu Leu Ile

1445 1450 1455

cga ctt tgc gcc cac aag aac ccg cgt tct cgc att ttg gag att
 4419
 Arg Leu Cys Ala His Lys Asn Pro Arg Ser Arg Ile Leu Glu Ile

1460 1465 1470

ggc gga ggc acg ggc ggc tgc aca aag ctt att gtc aat gca ttg

4464
 Gly Gly Gly Thr Gly Gly Cys Thr Lys Leu Ile Val Asn Ala Leu
 1475 1480 1485

gga aac acc aag ccg atc gat cgt tat gac ttc acc gat gtg tct
 4509
 Gly Asn Thr Lys Pro Ile Asp Arg Tyr Asp Phe Thr Asp Val Ser
 1490 1495 1500

gcc ggg ttt ttc gag tcg gcg cgt gag caa ttt gcg gat tgg caa
 4554
 Ala Gly Phe Phe Glu Ser Ala Arg Glu Gln Phe Ala Asp Trp Gln
 1505 1510 1515

gac gtg atg act ttc aaa aaa ttg gat att gaa agc gat ccc gag
 4599
 Asp Val Met Thr Phe Lys Lys Leu Asp Ile Glu Ser Asp Pro Glu
 1520 1525 1530

caa caa ggg ttt gaa tgt gcc acc tac gat gtg gtc gtg gct tgc
 4644
 Gln Gln Gly Phe Glu Cys Ala Thr Tyr Asp Val Val Val Ala Cys
 1535 1540 1545

cag gtc ctg cat gca act cga tgc atg aaa cga aca ctg agt aac
 4689
 Gln Val Leu His Ala Thr Arg Cys Met Lys Arg Thr Leu Ser Asn
 1550 1555 1560

gtt cga aaa ttg ctc aag cct ggg ggc aac ttg att ttg gtt gag
 4734
 Val Arg Lys Leu Leu Lys Pro Gly Gly Asn Leu Ile Leu Val Glu
 1565 1570 1575

act acc agg gat cag ctc gat ttg ttc ttt acc ttc gga ctg ttg
 4779

Thr Thr	Arg Asp Gln Leu Asp	Leu Phe Phe Thr Phe	Gly Leu Leu
1580	1585	1590	

cca ggt 4824	tgg tgg ctc agt gag	gag cct gag cgg aag	tcg acg cca
Pro Gly	Trp Trp Leu Ser Glu	Glu Pro Glu Arg Lys	Ser Thr Pro
1595	1600	1605	

tcg ctc 4869	act acc gat ctt tgg	aac acc atg ttg gac	acg agc ggt
Ser Leu	Thr Thr Asp Leu Trp	Asn Thr Met Leu Asp	Thr Ser Gly
1610	1615	1620	

ttc aac 4914	ggt gtg gaa ttg gag	gtt cgt gat tgt gaa	gac gat gag
Phe Asn	Gly Val Glu Leu Glu	Val Arg Asp Cys Glu	Asp Asp Glu
1625	1630	1635	

ttt tac 4959	atg atc agc aca atg	cta tcg acg gct aga	aaa gag aat
Phe Tyr	Met Ile Ser Thr Met	Leu Ser Thr Ala Arg	Lys Glu Asn
1640	1645	1650	

aca acc 5004	ccg gat aca gtg gca	gaa tcg gag gtg ctt	ttg ctg cac
Thr Thr	Pro Asp Thr Val Ala	Glu Ser Glu Val Leu	Leu Leu His
1655	1660	1665	

gga gcg 5049	ctc cga cct cct tca	tct tgg ctg gaa agt	ctc cag gca
Gly Ala	Leu Arg Pro Pro Ser	Ser Trp Leu Glu Ser	Leu Gln Ala
1670	1675	1680	

gca att 5094	tgt gaa aag acc agt	tct agc cca tcg atc	aac gct ctg
Ala Ile	Cys Glu Lys Thr Ser	Ser Ser Pro Ser Ile	Asn Ala Leu

1685	1690	1695
ggc gag gta gat acc act gga agg aca tgc att ttt ctt ggg gaa 5139		
Gly Glu Val Asp Thr Thr Gly Arg Thr Cys Ile Phe Leu Gly Glu		
1700	1705	1710
atg gag tcc tcg ctc ctt gga gag gtg gga agc gag acc ttc aaa 5184		
Met Glu Ser Ser Leu Leu Gly Glu Val Gly Ser Glu Thr Phe Lys		
1715	1720	1725
tcc atc acc gcg atg ctg aat aac tgc aac gca ctt ctc tgg gtg 5229		
Ser Ile Thr Ala Met Leu Asn Asn Cys Asn Ala Leu Leu Trp Val		
1730	1735	1740
tct aga gga gca gcc atg agc tcc gag gat cca tgg aaa gct cta 5274		
Ser Arg Gly Ala Ala Met Ser Ser Glu Asp Pro Trp Lys Ala Leu		
1745	1750	1755
cat att ggt ctg ctg cgt acc atc cgc aac gaa aat aac ggg aag 5319		
His Ile Gly Leu Leu Arg Thr Ile Arg Asn Glu Asn Asn Gly Lys		
1760	1765	1770
gaa tat gta tcg ttg gat ctc gat cct tct cga aac gca tac acc 5364		
Glu Tyr Val Ser Leu Asp Leu Asp Pro Ser Arg Asn Ala Tyr Thr		
1775	1780	1785
cac gag tcc ctg tat gct atc tgc aat atc ttc aat ggc cgc ctc 5409		
His Glu Ser Leu Tyr Ala Ile Cys Asn Ile Phe Asn Gly Arg Leu		

1790	1795	1800
ggc gac ctt tcc gaa gac aag	gag ttt gaa ttt gca	gag aga aac
5454		
Gly Asp Leu Ser Glu Asp Lys	Glu Phe Glu Phe Ala	Glu Arg Asn
1805	1810	1815
ggc gtc atc cac gta ccg cga	ctt ttc aat gac ccg	cac tgg aag
5499		
Gly Val Ile His Val Pro Arg	Leu Phe Asn Asp Pro	His Trp Lys
1820	1825	1830
gac caa gaa gcg gtt gag gtc	aca ctg cag ccg ttc	gag caa ccc
5544		
Asp Gln Glu Ala Val Glu Val	Thr Leu Gln Pro Phe	Glu Gln Pro
1835	1840	1845
ggg cgt cgt ctg cgg atg gag	gtt gag acg cca ggg	ctc tta gac
5589		
Gly Arg Arg Leu Arg Met Glu	Val Glu Thr Pro Gly	Leu Leu Asp
1850	1855	1860
tcc ctg caa ttt cga gac gac	gaa gga cgt gaa ggc	aag gat ctt
5634		
Ser Leu Gln Phe Arg Asp Asp	Glu Gly Arg Glu Gly	Lys Asp Leu
1865	1870	1875
ccg gat gat tgg gta gaa atc	gaa ccc aaa gct ttc	ggg ctc aat
5679		
Pro Asp Asp Trp Val Glu Ile	Glu Pro Lys Ala Phe	Gly Leu Asn
1880	1885	1890
ttt cgg gat gtc atg gtt gcc	atg ggt caa ttg gag	gcc aac cgt
5724		
Phe Arg Asp Val Met Val Ala	Met Gly Gln Leu Glu	Ala Asn Arg
1895	1900	1905

gtg atg ggc ttc gaa tgc gcc gga gtg atc aca aag ctc ggt gga
5769

Val Met Gly Phe Glu Cys Ala Gly Val Ile Thr Lys Leu Gly Gly

1910

1915

1920

gct gct gcc gct agc caa ggc ctc aga tta ggg gac cgc gta tgt
5814

Ala Ala Ala Ala Ser Gln Gly Leu Arg Leu Gly Asp Arg Val Cys

1925

1930

1935

gca cta ctg aaa ggc cat tgg gcg acc aga aca cag acg ccg tac
5859

Ala Leu Leu Lys Gly His Trp Ala Thr Arg Thr Gln Thr Pro Tyr

1940

1945

1950

act aat gtc gtc cgt att ccg gac gaa atg ggc ttc cca gaa gcc
5904

Thr Asn Val Val Arg Ile Pro Asp Glu Met Gly Phe Pro Glu Ala

1955

1960

1965

gct tcg gtc ccc ctg gct ttc act acc gca tat att gcg ctt tat
5949

Ala Ser Val Pro Leu Ala Phe Thr Thr Ala Tyr Ile Ala Leu Tyr

1970

1975

1980

acc acg gca aag cta cga cga ggc gaa aga gtc ttg atc cac agt
5994

Thr Thr Ala Lys Leu Arg Arg Gly Glu Arg Val Leu Ile His Ser

1985

1990

1995

gga gct gga ggc gtc ggt caa gca gcg atc att ttg tcc cag ctt
6039

Gly Ala Gly Gly Val Gly Gln Ala Ala Ile Ile Leu Ser Gln Leu

2000

2005

2010

gcg ggt gcc gag gtc ttc gtc aca gcg gga act caa gcc aag cgt
6084
Ala Gly Ala Glu Val Phe Val Thr Ala Gly Thr Gln Ala Lys Arg

2015

2020

2025

gac ttt gtc ggc gat aaa ttc ggc atc aat ccg gat cat atc ttc
6129
Asp Phe Val Gly Asp Lys Phe Gly Ile Asn Pro Asp His Ile Phe

2030

2035

2040

tcg agc agg aat gac tta ttc gtc gac ggc atc aaa gcc tac acg
6174
Ser Ser Arg Asn Asp Leu Phe Val Asp Gly Ile Lys Ala Tyr Thr

2045

2050

2055

ggc gga ctt ggc gtt cat gtc gtt cta aac tca ttg gca ggt caa
6219
Gly Gly Leu Gly Val His Val Val Leu Asn Ser Leu Ala Gly Gln

2060

2065

2070

ctc ctc caa gca agc ttt gac tgc atg gcc gaa ttc ggc aga ttt
6264
Leu Leu Gln Ala Ser Phe Asp Cys Met Ala Glu Phe Gly Arg Phe

2075

2080

2085

gtt gag att gga aaa aag gac ctg gag caa aac agc aga ctt gac
6309
Val Glu Ile Gly Lys Lys Asp Leu Glu Gln Asn Ser Arg Leu Asp

2090

2095

2100

atg ctg cca ttc acc cgg gac gtc tct ttc aca tca att gat ctt
6354
Met Leu Pro Phe Thr Arg Asp Val Ser Phe Thr Ser Ile Asp Leu

2105

2110

2115

ctc tcg tgg caa aga gcc aaa agt gaa gaa gta tcc gaa gcg ttg

6399
 Leu Ser Trp Gln Arg Ala Lys Ser Glu Glu Val Ser Glu Ala Leu
 2120 2125 2130

 aac cat gtc aca aaa ctc ctc gag aca aaa gcg att ggc ttg att
 6444
 Asn His Val Thr Lys Leu Leu Glu Thr Lys Ala Ile Gly Leu Ile
 2135 2140 2145

 ggt cca atc cag cag cac tcc ttg tca aac atc gag aag gcc ttc
 6489
 Gly Pro Ile Gln Gln His Ser Leu Ser Asn Ile Glu Lys Ala Phe
 2150 2155 2160

 cgt acg atg cag agt ggt cag cat gtt ggc aaa gtt gtg gtc aat
 6534
 Arg Thr Met Gln Ser Gly Gln His Val Gly Lys Val Val Val Asn
 2165 2170 2175

 gta tct ggg gac gaa ctg gtc cca gtc ggc gat gga ggg ttc tcg
 6579
 Val Ser Gly Asp Glu Leu Val Pro Val Gly Asp Gly Gly Phe Ser
 2180 2185 2190

 ctg aag ctg aag cct gac agt tct tac cta gtt gct ggt ggg ctg
 6624
 Leu Lys Leu Lys Pro Asp Ser Ser Tyr Leu Val Ala Gly Gly Leu
 2195 2200 2205

 ggg gga att gga aag cag atc tgt cag tgg ctt gtt gat cat ggc
 6669
 Gly Gly Ile Gly Lys Gln Ile Cys Gln Trp Leu Val Asp His Gly
 2210 2215 2220

 gcg aag cac ttg att atc cta tcg aga agt gca aag gcc agt cca
 6714

Ala Lys	His Leu Ile Ile Leu	Ser Arg Ser Ala Lys	Ala Ser Pro
2225	2230	2235	

ttc ata	acc agc ttg caa aat	caa cag tgc gct gtc	tat cta cac
6759			
Phe Ile	Thr Ser Leu Gln Asn	Gln Gln Cys Ala Val	Tyr Leu His
2240	2245	2250	

gca tgt	gac atc tca gat caa	gat cag gtc acc aag	gtg ctc cgg
6804			
Ala Cys	Asp Ile Ser Asp Gln	Asp Gln Val Thr Lys	Val Leu Arg
2255	2260	2265	

ttg tgc	gaa gaa gca cat gca	ccg cca att cga ggt	atc ata caa
6849			
Leu Cys	Glu Glu Ala His Ala	Pro Pro Ile Arg Gly	Ile Ile Gln
2270	2275	2280	

ggg gcc	atg gtt ctc aag gac	gcg ctt cta tcg cga	atg aca ttg
6894			
Gly Ala	Met Val Leu Lys Asp	Ala Leu Leu Ser Arg	Met Thr Leu
2285	2290	2295	

gat gaa	ttt aat gca gca aca	cgc cca aaa gta cag	ggg agt tgg
6939			
Asp Glu	Phe Asn Ala Ala Thr	Arg Pro Lys Val Gln	Gly Ser Trp
2300	2305	2310	

tat ctt	cac aag atc gca cag	gat gtt gac ttc ttc	gtg atg ctc
6984			
Tyr Leu	His Lys Ile Ala Gln	Asp Val Asp Phe Phe	Val Met Leu
2315	2320	2325	

tca tcc	ctt gtt ggg gtc atg	ggg ggg gca ggc cag	gcc aat tac
7029			
Ser Ser	Leu Val Gly Val Met	Gly Gly Ala Gly Gln	Ala Asn Tyr

2330	2335	2340
gca gct gct ggt gca ttc cag 7074	gac gca ctt gcg cac	cac cgg aga
Ala Ala Ala Gly Ala Phe Gln	Asp Ala Leu Ala His	His Arg Arg
2345	2350	2355
gcc cat ggc atg ccg gct gtc 7119	acc att gac ttg ggc	atg gtc aag
Ala His Gly Met Pro Ala Val	Thr Ile Asp Leu Gly	Met Val Lys
2360	2365	2370
tct gtt gga tac gtg gct gaa 7164	act ggc cgt ggt gtg	gcc gac cgg
Ser Val Gly Tyr Val Ala Glu	Thr Gly Arg Gly Val	Ala Asp Arg
2375	2380	2385
ctc gct aga ata ggt tac aag 7209	cct atg cat gaa aag	gac gtc atg
Leu Ala Arg Ile Gly Tyr Lys	Pro Met His Glu Lys	Asp Val Met
2390	2395	2400
gat gtg ttg gag aag gca atc 7254	ctg tgt tct tcc cct	caa ttt cca
Asp Val Leu Glu Lys Ala Ile	Leu Cys Ser Ser Pro	Gln Phe Pro
2405	2410	2415
tca cct ccc gca gct gtg gtt 7299	aca gga atc aac aca	tcc ccg ggt
Ser Pro Pro Ala Ala Val Val	Thr Gly Ile Asn Thr	Ser Pro Gly
2420	2425	2430
gct cac tgg acc gag gca aac 7344	tgg ata cag gaa cag	cgg ttt gtg
Ala His Trp Thr Glu Ala Asn	Trp Ile Gln Glu Gln	Arg Phe Val

2435	2440	2445
gga ctt 7389	aaa tac cgc caa gtc	ctt cat gca gac caa tcc ttt gtc
Gly Leu	Lys Tyr Arg Gln Val	Leu His Ala Asp Gln Ser Phe Val
2450	2455	2460
tct tcg 7434	cat aaa aaa gga cca	gat ggc gtg cgg gcc caa cta agc
Ser Ser	His Lys Lys Gly Pro	Asp Gly Val Arg Ala Gln Leu Ser
2465	2470	2475
agg gtc 7479	acc tct cac gac gag	gcc att tct atc gtc ctc aaa gca
Arg Val	Thr Ser His Asp Glu	Ala Ile Ser Ile Val Leu Lys Ala
2480	2485	2490
atg acg 7524	gaa aag ctg atg cga	atg ttt ggt ctg gca gaa gac gac
Met Thr	Glu Lys Leu Met Arg	Met Phe Gly Leu Ala Glu Asp Asp
2495	2500	2505
atg tcc 7569	tcg tcc aaa aac ctg	gca ggt gtc ggc gta gac tca ctc
Met Ser	Ser Ser Lys Asn Leu	Ala Gly Val Gly Val Asp Ser Leu
2510	2515	2520
gtc gcc 7614	att gaa ctt cga aac	tgg atc aca tct gaa atc cat gtt
Val Ala	Ile Glu Leu Arg Asn	Trp Ile Thr Ser Glu Ile His Val
2525	2530	2535
gat gtg 7659	tcg atc ttt gag ctc	atg aat ggt aac acc atc gcc ggc
Asp Val	Ser Ile Phe Glu Leu	Met Asn Gly Asn Thr Ile Ala Gly
2540	2545	2550

ctc gtc gag tta gtt gtg gcg aaa tgc agt taa

7692

Leu Val Glu Leu Val Val Ala Lys Cys Ser

2555

2560

<210> 46

<211> 2563

<212> PRT

<213> Penicillium citrinum

<400> 46

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1 5 10 15

Ala Thr Ala Met Ala Gly Ser Ala Cys Ser Asn Thr Ser Thr Pro Ile
20 25 30

Ala Ile Val Gly Met Gly Cys Arg Phe Ala Gly Asp Ala Thr Ser Pro
35 40 45

Gln Lys Leu Trp Glu Met Val Glu Arg Gly Gly Ser Ala Trp Ser Lys
50 55 60

Val Pro Ser Ser Arg Phe Asn Val Arg Gly Val Tyr His Pro Asn Gly
65 70 75 80

Glu Arg Val Gly Ser Thr His Val Lys Gly Gly His Phe Ile Asp Glu
85 90 95

Asp Pro Ala Leu Phe Asp Ala Ala Phe Phe Asn Met Thr Thr Glu Val
100 105 110

Ala Ser Cys Met Asp Pro Gln Tyr Arg Leu Met Leu Glu Val Val Tyr
115 120 125

Glu Ser Leu Glu Ser Ala Gly Ile Thr Ile Asp Gly Met Ala Gly Ser
130 135 140

Asn Thr Ser Val Phe Gly Gly Val Met Tyr His Asp Tyr Gln Asp Ser
145 150 155 160

Leu Asn Arg Asp Pro Glu Thr Val Pro Arg Tyr Phe Ile Thr Gly Asn
165 170 175

Ser Gly Thr Met Leu Ser Asn Arg Ile Ser His Phe Tyr Asp Leu Arg
180 185 190

Gly Pro Ser Val Thr Val Asp Thr Ala Cys Ser Thr Thr Leu Thr Ala
195 200 205

Leu His Leu Ala Cys Gln Ser Leu Arg Thr Gly Glu Ser Asp Thr Ala
210 215 220

Ile Val Ile Gly Ala Asn Leu Leu Leu Asn Pro Asp Val Phe Val Thr
225 230 235 240

Met Ser Asn Leu Gly Phe Leu Ser Pro Asp Gly Ile Ser Tyr Ser Phe
245 250 255

Asp Pro Arg Ala Asn Gly Tyr Gly Arg Gly Glu Gly Ile Ala Ala Leu
260 265 270

Val Ile Lys Ala Leu Pro Asn Ala Leu Arg Asp Gln Asp Pro Ile Arg
275 280 285

Ala Val Ile Arg Glu Thr Ala Leu Asn Gln Asp Gly Lys Thr Pro Ala
290 295 300

Ile Thr Ala Pro Ser Asp Val Ala Gln Lys Ser Leu Ile Gln Glu Cys
305 310 315 320

Tyr Asp Lys Ala Gly Leu Asp Met Ser Leu Thr Ser Tyr Val Glu Ala
325 330 335

His Gly Thr Gly Thr Pro Thr Gly Asp Pro Leu Glu Ile Ser Ala Ile
340 345 350

Ser Ala Ala Phe Lys Gly His Pro Leu His Leu Gly Ser Val Lys Ala
355 360 365

Asn Ile Gly His Thr Glu Ala Ala Ser Gly Leu Ala Ser Ile Ile Lys
370 375 380

Val Ala Leu Ala Leu Glu Lys Gly Leu Ile Pro Pro Asn Ala Arg Phe
385 390 395 400

Leu Gln Lys Asn Ser Lys Leu Met Leu Asp Gln Lys Asn Ile Lys Ile
405 410 415

Pro Met Ser Ala Gln Asp Trp Pro Val Lys Asp Gly Thr Arg Arg Ala
420 425 430

Ser Val Asn Asn Phe Gly Phe Gly Gly Ser Asn Ala His Val Ile Leu
435 440 445

Glu Ser Tyr Asp Arg Ala Ser Leu Ala Leu Pro Glu Asp Gln Val His
450 455 460

Val Asn Gly Asn Ser Glu His Gly Arg Val Glu Asp Gly Ser Lys Gln
465 470 475 480

Ser Arg Ile Tyr Val Val Arg Ala Lys Asp Glu Gln Ala Cys Arg Arg
485 490 495

Thr Ile Ala Ser Leu Arg Asp Tyr Ile Lys Ser Val Ala Asp Ile Asp
500 505 510

Gly Glu Pro Phe Leu Ala Ser Leu Ala Tyr Thr Leu Gly Ser Arg Arg

515					520					525					
Ser	Ile	Leu	Pro	Trp	Thr	Ser	Val	Tyr	Val	Ala	Asp	Ser	Leu	Gly	Gly
	530					535					540				
Leu	Val	Ser	Ala	Leu	Ser	Asp	Glu	Ser	Asn	Gln	Pro	Lys	Arg	Ala	Asn
545					550					555					560
Glu	Lys	Val	Arg	Leu	Gly	Phe	Val	Phe	Thr	Gly	Gln	Gly	Ala	Gln	Trp
				565					570					575	
His	Ala	Met	Gly	Arg	Glu	Leu	Val	Asn	Thr	Phe	Pro	Val	Phe	Lys	Gln
			580					585					590		
Ala	Ile	Leu	Glu	Cys	Asp	Gly	Tyr	Ile	Lys	Gln	Leu	Gly	Ala	Ser	Trp
		595					600					605			
Asn	Phe	Met	Glu	Glu	Leu	His	Arg	Asp	Glu	Leu	Thr	Thr	Arg	Val	Asn
	610					615					620				
Asp	Ala	Glu	Tyr	Ser	Leu	Pro	Leu	Ser	Thr	Ala	Ile	Gln	Ile	Ala	Leu
625					630					635					640
Val	Arg	Leu	Leu	Trp	Ser	Trp	Gly	Ile	Arg	Pro	Thr	Gly	Ile	Thr	Ser
				645					650					655	
His	Ser	Ser	Gly	Glu	Ala	Ala	Ala	Ala	Tyr	Ala	Ala	Gly	Ala	Leu	Ser
			660					665					670		
Ala	Arg	Ser	Ala	Ile	Gly	Ile	Thr	Tyr	Ile	Arg	Gly	Val	Leu	Thr	Thr
		675					680					685			
Lys	Pro	Lys	Pro	Ala	Leu	Ala	Ala	Lys	Gly	Gly	Met	Met	Ala	Val	Gly
	690					695					700				
Leu	Gly	Arg	Ser	Glu	Thr	Asn	Val	Tyr	Ile	Ser	Arg	Leu	Asn	Gln	Glu
705					710					715					720

Asp Gly Cys Val Val Val Gly Cys Ile Asn Ser Gln Cys Ser Val Thr
725 730 735

Val Ser Gly Asp Leu Gly Ala Ile Glu Lys Leu Glu Lys Leu Leu His
740 745 750

Ala Asp Gly Ile Phe Thr Arg Lys Leu Lys Val Thr Glu Ala Phe His
755 760 765

Ser Ser His Met Arg Pro Met Ala Asp Ala Phe Gly Ala Ser Leu Arg
770 775 780

Asp Leu Phe Asn Ser Asp Asn Asn Asn Asp Asn Pro Asn Ala Asp Thr
785 790 795 800

Ser Lys Gly Val Leu Tyr Ser Ser Pro Lys Thr Gly Ser Arg Met Thr
805 810 815

Asp Leu Lys Leu Leu Leu Asp Pro Thr His Trp Met Asp Ser Met Leu
820 825 830

Gln Pro Val Glu Phe Glu Ser Ser Leu Arg Glu Met Cys Phe Asp Pro
835 840 845

Asn Thr Lys Glu Lys Ala Val Asp Val Ile Ile Glu Ile Gly Pro His
850 855 860

Gly Ala Leu Gly Gly Pro Ile Asn Gln Val Met Gln Asp Leu Gly Leu
865 870 875 880

Lys Gly Thr Asp Ile Asn Tyr Leu Ser Cys Leu Ser Arg Gly Arg Ser
885 890 895

Ser Leu Glu Thr Met Tyr Arg Ala Ala Thr Glu Leu Ile Ser Lys Gly
900 905 910

Tyr Gly Leu Lys Met Asp Ala Ile Asn Phe Pro His Gly Arg Lys Glu
915 920 925

Pro Arg Val Lys Val Leu Ser Asp Leu Pro Ala Tyr Pro Trp Asn His
930 935 940

Gln Thr Arg Tyr Trp Arg Glu Pro Arg Gly Ser Arg Glu Ser Lys Gln
945 950 955 960

Arg Thr His Pro Pro His Thr Leu Ile Gly Ser Arg Glu Ser Leu Ser
965 970 975

Pro His Phe Ala Pro Lys Trp Lys His Val Leu Arg Leu Ser Asp Ile
980 985 990

Pro Trp Ile Arg Asp His Val Val Gly Ser Ser Ile Ile Phe Pro Gly
995 1000 1005

Ala Gly Phe Ile Ser Met Ala Ile Glu Gly Phe Ser Gln Val Cys
1010 1015 1020

Pro Pro Val Ala Gly Ala Ser Ile Asn Tyr Asn Leu Arg Asp Val
1025 1030 1035

Glu Leu Ala Gln Ala Leu Ile Ile Pro Ala Asp Ala Glu Ala Glu
1040 1045 1050

Val Asp Leu Arg Leu Thr Ile Arg Ser Cys Glu Glu Arg Ser Leu
1055 1060 1065

Gly Thr Lys Asn Trp His Gln Phe Ser Val His Ser Ile Ser Gly
1070 1075 1080

Glu Asn Asn Thr Trp Thr Glu His Cys Thr Gly Leu Ile Arg Ser
1085 1090 1095

Glu Ser Glu Arg Ser His Leu Asp Cys Ser Thr Val Glu Ala Ser
1100 1105 1110

Arg Arg Leu Asn Leu Gly Ser Asp Asn Arg Ser Ile Asp Pro Asn

1115		1120		1125
Asp Leu Trp Glu Ser Leu His	Ala Asn Gly Ile Cys	His Gly Pro		
1130	1135	1140		
Ile Phe Gln Asn Ile Gln Arg	Ile Gln Asn Asn Gly	Gln Gly Ser		
1145	1150	1155		
Phe Cys Arg Phe Ser Ile Ala	Asp Thr Ala Ser Ala	Met Pro His		
1160	1165	1170		
Ser Tyr Glu Asn Arg His Ile	Val His Pro Thr Thr	Leu Asp Ser		
1175	1180	1185		
Val Ile Gln Ala Ala Tyr Thr	Val Leu Pro Tyr Ala	Gly Thr Arg		
1190	1195	1200		
Met Lys Thr Ala Met Val Pro	Arg Arg Leu Arg Asn	Val Lys Ile		
1205	1210	1215		
Ser Ser Ser Leu Ala Asp Leu	Glu Ala Gly Asp Ala	Leu Asp Ala		
1220	1225	1230		
Gln Ala Ser Ile Lys Asp Arg	Asn Ser Gln Ser Phe	Ser Thr Asp		
1235	1240	1245		
Leu Ala Val Phe Asp Asp Tyr	Asp Ser Gly Ser Ser	Pro Ser Asp		
1250	1255	1260		
Gly Ile Pro Val Ile Glu Ile	Glu Gly Leu Val Phe	Gln Ser Val		
1265	1270	1275		
Gly Ser Ser Phe Ser Asp Gln	Lys Ser Asp Ser Asn	Asp Thr Glu		
1280	1285	1290		
Asn Ala Cys Ser Ser Trp Val	Trp Ala Pro Asp Ile	Ser Leu Gly		
1295	1300	1305		

Asp Ser Thr Trp Leu Lys Glu Lys Leu Ser Thr Glu Ala Glu Thr
1310 1315 1320

Lys Glu Thr Glu Leu Met Met Asp Leu Arg Arg Cys Thr Ile Asn
1325 1330 1335

Phe Ile Gln Glu Ala Val Thr Asp Leu Thr Asn Ser Asp Ile Gln
1340 1345 1350

His Leu Asp Gly His Leu Gln Lys Tyr Phe Asp Trp Met Asn Val
1355 1360 1365

Gln Leu Asp Leu Ala Arg Gln Asn Lys Leu Ser Pro Ala Ser Cys
1370 1375 1380

Asp Trp Leu Ser Asp Asp Ala Glu Gln Lys Lys Cys Leu Gln Ala
1385 1390 1395

Arg Val Ala Gly Glu Ser Val Asn Gly Glu Met Ile Ser Arg Leu
1400 1405 1410

Gly Pro Gln Leu Ile Ala Met Leu Arg Arg Glu Thr Glu Pro Leu
1415 1420 1425

Glu Leu Met Met Gln Asp Gln Leu Leu Ser Arg Tyr Tyr Val Asn
1430 1435 1440

Ala Ile Lys Trp Ser Arg Ser Asn Ala Gln Ala Ser Glu Leu Ile
1445 1450 1455

Arg Leu Cys Ala His Lys Asn Pro Arg Ser Arg Ile Leu Glu Ile
1460 1465 1470

Gly Gly Gly Thr Gly Gly Cys Thr Lys Leu Ile Val Asn Ala Leu
1475 1480 1485

Gly Asn Thr Lys Pro Ile Asp Arg Tyr Asp Phe Thr Asp Val Ser
1490 1495 1500

Ala	Gly	Phe	Phe	Glu	Ser	Ala	Arg	Glu	Gln	Phe	Ala	Asp	Trp	Gln
1505						1510					1515			
Asp	Val	Met	Thr	Phe	Lys	Lys	Leu	Asp	Ile	Glu	Ser	Asp	Pro	Glu
1520						1525					1530			
Gln	Gln	Gly	Phe	Glu	Cys	Ala	Thr	Tyr	Asp	Val	Val	Val	Ala	Cys
1535						1540					1545			
Gln	Val	Leu	His	Ala	Thr	Arg	Cys	Met	Lys	Arg	Thr	Leu	Ser	Asn
1550						1555					1560			
Val	Arg	Lys	Leu	Leu	Lys	Pro	Gly	Gly	Asn	Leu	Ile	Leu	Val	Glu
1565						1570					1575			
Thr	Thr	Arg	Asp	Gln	Leu	Asp	Leu	Phe	Phe	Thr	Phe	Gly	Leu	Leu
1580						1585					1590			
Pro	Gly	Trp	Trp	Leu	Ser	Glu	Glu	Pro	Glu	Arg	Lys	Ser	Thr	Pro
1595						1600					1605			
Ser	Leu	Thr	Thr	Asp	Leu	Trp	Asn	Thr	Met	Leu	Asp	Thr	Ser	Gly
1610						1615					1620			
Phe	Asn	Gly	Val	Glu	Leu	Glu	Val	Arg	Asp	Cys	Glu	Asp	Asp	Glu
1625						1630					1635			
Phe	Tyr	Met	Ile	Ser	Thr	Met	Leu	Ser	Thr	Ala	Arg	Lys	Glu	Asn
1640						1645					1650			
Thr	Thr	Pro	Asp	Thr	Val	Ala	Glu	Ser	Glu	Val	Leu	Leu	Leu	His
1655						1660					1665			
Gly	Ala	Leu	Arg	Pro	Pro	Ser	Ser	Trp	Leu	Glu	Ser	Leu	Gln	Ala
1670						1675					1680			
Ala	Ile	Cys	Glu	Lys	Thr	Ser	Ser	Ser	Pro	Ser	Ile	Asn	Ala	Leu

1685						1690					1695			
Gly	Glu	Val	Asp	Thr	Thr	Gly	Arg	Thr	Cys	Ile	Phe	Leu	Gly	Glu
1700						1705					1710			
Met	Glu	Ser	Ser	Leu	Leu	Gly	Glu	Val	Gly	Ser	Glu	Thr	Phe	Lys
1715						1720					1725			
Ser	Ile	Thr	Ala	Met	Leu	Asn	Asn	Cys	Asn	Ala	Leu	Leu	Trp	Val
1730						1735					1740			
Ser	Arg	Gly	Ala	Ala	Met	Ser	Ser	Glu	Asp	Pro	Trp	Lys	Ala	Leu
1745						1750					1755			
His	Ile	Gly	Leu	Leu	Arg	Thr	Ile	Arg	Asn	Glu	Asn	Asn	Gly	Lys
1760						1765					1770			
Glu	Tyr	Val	Ser	Leu	Asp	Leu	Asp	Pro	Ser	Arg	Asn	Ala	Tyr	Thr
1775						1780					1785			
His	Glu	Ser	Leu	Tyr	Ala	Ile	Cys	Asn	Ile	Phe	Asn	Gly	Arg	Leu
1790						1795					1800			
Gly	Asp	Leu	Ser	Glu	Asp	Lys	Glu	Phe	Glu	Phe	Ala	Glu	Arg	Asn
1805						1810					1815			
Gly	Val	Ile	His	Val	Pro	Arg	Leu	Phe	Asn	Asp	Pro	His	Trp	Lys
1820						1825					1830			
Asp	Gln	Glu	Ala	Val	Glu	Val	Thr	Leu	Gln	Pro	Phe	Glu	Gln	Pro
1835						1840					1845			
Gly	Arg	Arg	Leu	Arg	Met	Glu	Val	Glu	Thr	Pro	Gly	Leu	Leu	Asp
1850						1855					1860			
Ser	Leu	Gln	Phe	Arg	Asp	Asp	Glu	Gly	Arg	Glu	Gly	Lys	Asp	Leu
1865						1870					1875			

Pro Asp Asp Trp Val Glu Ile Glu Pro Lys Ala Phe Gly Leu Asn
1880 1885 1890

Phe Arg Asp Val Met Val Ala Met Gly Gln Leu Glu Ala Asn Arg
1895 1900 1905

Val Met Gly Phe Glu Cys Ala Gly Val Ile Thr Lys Leu Gly Gly
1910 1915 1920

Ala Ala Ala Ala Ser Gln Gly Leu Arg Leu Gly Asp Arg Val Cys
1925 1930 1935

Ala Leu Leu Lys Gly His Trp Ala Thr Arg Thr Gln Thr Pro Tyr
1940 1945 1950

Thr Asn Val Val Arg Ile Pro Asp Glu Met Gly Phe Pro Glu Ala
1955 1960 1965

Ala Ser Val Pro Leu Ala Phe Thr Thr Ala Tyr Ile Ala Leu Tyr
1970 1975 1980

Thr Thr Ala Lys Leu Arg Arg Gly Glu Arg Val Leu Ile His Ser
1985 1990 1995

Gly Ala Gly Gly Val Gly Gln Ala Ala Ile Ile Leu Ser Gln Leu
2000 2005 2010

Ala Gly Ala Glu Val Phe Val Thr Ala Gly Thr Gln Ala Lys Arg
2015 2020 2025

Asp Phe Val Gly Asp Lys Phe Gly Ile Asn Pro Asp His Ile Phe
2030 2035 2040

Ser Ser Arg Asn Asp Leu Phe Val Asp Gly Ile Lys Ala Tyr Thr
2045 2050 2055

Gly Gly Leu Gly Val His Val Val Leu Asn Ser Leu Ala Gly Gln
2060 2065 2070

Leu Leu Gln Ala Ser Phe Asp Cys Met Ala Glu Phe Gly Arg Phe
2075 2080 2085

Val Glu Ile Gly Lys Lys Asp Leu Glu Gln Asn Ser Arg Leu Asp
2090 2095 2100

Met Leu Pro Phe Thr Arg Asp Val Ser Phe Thr Ser Ile Asp Leu
2105 2110 2115

Leu Ser Trp Gln Arg Ala Lys Ser Glu Glu Val Ser Glu Ala Leu
2120 2125 2130

Asn His Val Thr Lys Leu Leu Glu Thr Lys Ala Ile Gly Leu Ile
2135 2140 2145

Gly Pro Ile Gln Gln His Ser Leu Ser Asn Ile Glu Lys Ala Phe
2150 2155 2160

Arg Thr Met Gln Ser Gly Gln His Val Gly Lys Val Val Val Asn
2165 2170 2175

Val Ser Gly Asp Glu Leu Val Pro Val Gly Asp Gly Gly Phe Ser
2180 2185 2190

Leu Lys Leu Lys Pro Asp Ser Ser Tyr Leu Val Ala Gly Gly Leu
2195 2200 2205

Gly Gly Ile Gly Lys Gln Ile Cys Gln Trp Leu Val Asp His Gly
2210 2215 2220

Ala Lys His Leu Ile Ile Leu Ser Arg Ser Ala Lys Ala Ser Pro
2225 2230 2235

Phe Ile Thr Ser Leu Gln Asn Gln Gln Cys Ala Val Tyr Leu His
2240 2245 2250

Ala Cys Asp Ile Ser Asp Gln Asp Gln Val Thr Lys Val Leu Arg

2255							2260						2265				
Leu	Cys	Glu	Glu	Ala	His	Ala	Pro	Pro	Ile	Arg	Gly	Ile	Ile	Gln			
2270						2275					2280						
Gly	Ala	Met	Val	Leu	Lys	Asp	Ala	Leu	Leu	Ser	Arg	Met	Thr	Leu			
2285						2290					2295						
Asp	Glu	Phe	Asn	Ala	Ala	Thr	Arg	Pro	Lys	Val	Gln	Gly	Ser	Trp			
2300						2305					2310						
Tyr	Leu	His	Lys	Ile	Ala	Gln	Asp	Val	Asp	Phe	Phe	Val	Met	Leu			
2315						2320					2325						
Ser	Ser	Leu	Val	Gly	Val	Met	Gly	Gly	Ala	Gly	Gln	Ala	Asn	Tyr			
2330						2335					2340						
Ala	Ala	Ala	Gly	Ala	Phe	Gln	Asp	Ala	Leu	Ala	His	His	Arg	Arg			
2345						2350					2355						
Ala	His	Gly	Met	Pro	Ala	Val	Thr	Ile	Asp	Leu	Gly	Met	Val	Lys			
2360						2365					2370						
Ser	Val	Gly	Tyr	Val	Ala	Glu	Thr	Gly	Arg	Gly	Val	Ala	Asp	Arg			
2375						2380					2385						
Leu	Ala	Arg	Ile	Gly	Tyr	Lys	Pro	Met	His	Glu	Lys	Asp	Val	Met			
2390						2395					2400						
Asp	Val	Leu	Glu	Lys	Ala	Ile	Leu	Cys	Ser	Ser	Pro	Gln	Phe	Pro			
2405						2410					2415						
Ser	Pro	Pro	Ala	Ala	Val	Val	Thr	Gly	Ile	Asn	Thr	Ser	Pro	Gly			
2420						2425					2430						
Ala	His	Trp	Thr	Glu	Ala	Asn	Trp	Ile	Gln	Glu	Gln	Arg	Phe	Val			
2435						2440					2445						

Gly Leu Lys Tyr Arg Gln Val Leu His Ala Asp Gln Ser Phe Val
2450 2455 2460

Ser Ser His Lys Lys Gly Pro Asp Gly Val Arg Ala Gln Leu Ser
2465 2470 2475

Arg Val Thr Ser His Asp Glu Ala Ile Ser Ile Val Leu Lys Ala
2480 2485 2490

Met Thr Glu Lys Leu Met Arg Met Phe Gly Leu Ala Glu Asp Asp
2495 2500 2505

Met Ser Ser Ser Lys Asn Leu Ala Gly Val Gly Val Asp Ser Leu
2510 2515 2520

Val Ala Ile Glu Leu Arg Asn Trp Ile Thr Ser Glu Ile His Val
2525 2530 2535

Asp Val Ser Ile Phe Glu Leu Met Asn Gly Asn Thr Ile Ala Gly
2540 2545 2550

Leu Val Glu Leu Val Val Ala Lys Cys Ser
2555 2560

<210> 47

<211> 1557

<212> DNA

<213> Penicillium citrinum

<220>

<221> CDS

<222> (1)..(1557)

<400> 47

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Met Leu Gly Gln Val Leu Leu Thr Val Glu Ser Tyr Gln Trp Val Ser

1

5

10

15

acc cct caa gcc ctt gtg gcg gtc gca gtg ctt ctt agt ctc atc gcc
96

Thr Pro Gln Ala Leu Val Ala Val Ala Val Leu Leu Ser Leu Ile Ala

20

25

30

tac cgt ttg cgg ggg cgc cag tcc gaa ctg caa gtc tat aat ccc aaa
144

Tyr Arg Leu Arg Gly Arg Gln Ser Glu Leu Gln Val Tyr Asn Pro Lys

35

40

45

aaa tgg tgg gag ttg acg acc atg agg gct agg cag gac ttc gat acg
192

Lys Trp Trp Glu Leu Thr Thr Met Arg Ala Arg Gln Asp Phe Asp Thr

50

55

60

tat ggt ccg agc tgg atc gaa gct tgg ttc tcg aaa aac gac aag ccc
240

Tyr Gly Pro Ser Trp Ile Glu Ala Trp Phe Ser Lys Asn Asp Lys Pro

65

70

75

80

ctg cgc ttc att gtt gat tcc ggc tat tgc acc atc ctc cca tcg tcc
288

Leu Arg Phe Ile Val Asp Ser Gly Tyr Cys Thr Ile Leu Pro Ser Ser

85

90

95

atg gcc gac gag ttt cgg aaa atc aaa gat atg tgc atg tac aag ttt
336

Met Ala Asp Glu Phe Arg Lys Ile Lys Asp Met Cys Met Tyr Lys Phe

100

105

110

ttg gcg gat gac ttt cac tct cat ctc cct gga ttc gac ggg ttc aag
384
Leu Ala Asp Asp Phe His Ser His Leu Pro Gly Phe Asp Gly Phe Lys

115

120

125

gaa atc tgc cag gat gca cat ctt gtc aac aaa gtt gtt ttg aac cag
432
Glu Ile Cys Gln Asp Ala His Leu Val Asn Lys Val Val Leu Asn Gln

130

135

140

tta caa acc caa gcc ccc aag tac aca aag cca ttg gct acc ttg gcc
480
Leu Gln Thr Gln Ala Pro Lys Tyr Thr Lys Pro Leu Ala Thr Leu Ala

145

150

155

160

gac gct act att gcc aag ttg ttc ggt aaa agc gag gag tgg caa acc
528
Asp Ala Thr Ile Ala Lys Leu Phe Gly Lys Ser Glu Glu Trp Gln Thr

165

170

175

gca cct gtc tat tcc aat gga ttg gac ctt gtc aca cga aca gtc aca
576
Ala Pro Val Tyr Ser Asn Gly Leu Asp Leu Val Thr Arg Thr Val Thr

180

185

190

ctc att atg gtc ggc gac aaa atc tgc cac aat gag gag tgg ctg gat
624
Leu Ile Met Val Gly Asp Lys Ile Cys His Asn Glu Glu Trp Leu Asp

195

200

205

att gca aag aac cat gcc gtg agt gtg gcg gta caa gct cgc caa ctt
672
Ile Ala Lys Asn His Ala Val Ser Val Ala Val Gln Ala Arg Gln Leu

210

215

220

cgc gta tgg ccc atg cta ctg cga ccg ctc gct cac tgg ttt caa ccg

720
 Arg Val Trp Pro Met Leu Leu Arg Pro Leu Ala His Trp Phe Gln Pro
 225 230 235 240

caa gga cgc aaa ttg cgt gac caa gtg cgc cgc gca cga aag atc att
 768
 Gln Gly Arg Lys Leu Arg Asp Gln Val Arg Arg Ala Arg Lys Ile Ile
 245 250 255

gat cct gag att cag cga cga cgt gct gaa aag gcc gca tgt gta gcg
 816
 Asp Pro Glu Ile Gln Arg Arg Arg Ala Glu Lys Ala Ala Cys Val Ala
 260 265 270

aag ggc gtg cag ccg ccc cag tac gtc gat acc atg caa tgg ttt gaa
 864
 Lys Gly Val Gln Pro Pro Gln Tyr Val Asp Thr Met Gln Trp Phe Glu
 275 280 285

gac acc gcc gac ggc cgc tgg tac gat gtg gcg ggt gct cag ctc gct
 912
 Asp Thr Ala Asp Gly Arg Trp Tyr Asp Val Ala Gly Ala Gln Leu Ala
 290 295 300

atg gat ttc gcc ggc atc tac gcc tcg acg gat ctt ttc gtc ggt gcc
 960
 Met Asp Phe Ala Gly Ile Tyr Ala Ser Thr Asp Leu Phe Val Gly Ala
 305 310 315 320

ctt gtg gac att gcc agg cac cca gac ctt att cag cct ctc cgc caa
 1008
 Leu Val Asp Ile Ala Arg His Pro Asp Leu Ile Gln Pro Leu Arg Gln
 325 330 335

gag atc cgc act gta atc gga gaa ggg ggc tgg acg cct gcc tct ctg
 1056

Glu Ile Arg Thr Val Ile Gly Glu Gly Gly Trp Thr Pro Ala Ser Leu

340

345

350

ttc aag ctg aag ctc ctc gac agc tgc atg aaa gag acg cag cga atc

1104

Phe Lys Leu Lys Leu Leu Asp Ser Cys Met Lys Glu Thr Gln Arg Ile

355

360

365

aag ccg gtc gag tgc gcc act atg cgc agt acc gct ctc aga gac atc

1152

Lys Pro Val Glu Cys Ala Thr Met Arg Ser Thr Ala Leu Arg Asp Ile

370

375

380

act cta tcc aat ggc ctc ttc att ccc aag ggc gag ttg gcc gct gtg

1200

Thr Leu Ser Asn Gly Leu Phe Ile Pro Lys Gly Glu Leu Ala Ala Val

385

390

395

400

gct gca gac cgc atg aac aac cct gat gtg tgg gaa aac ccc gaa aat

1248

Ala Ala Asp Arg Met Asn Asn Pro Asp Val Trp Glu Asn Pro Glu Asn

405

410

415

tat gat ccc tac cga ttt atg cgc atg cgc gag gat cca gac aag gcc

1296

Tyr Asp Pro Tyr Arg Phe Met Arg Met Arg Glu Asp Pro Asp Lys Ala

420

425

430

ttc acc gct caa ttg gag aat acc aac ggt gat cac atc ggc ttc ggc

1344

Phe Thr Ala Gln Leu Glu Asn Thr Asn Gly Asp His Ile Gly Phe Gly

435

440

445

tgg aac cca cgc gct tgt ccc ggg cgg ttc ttc gcc tcg aag gaa atc

1392

Trp Asn Pro Arg Ala Cys Pro Gly Arg Phe Phe Ala Ser Lys Glu Ile

450

455

460

aag att ctc ctc gct cat ata ctg att cag tat gat gtg aag cct gta
1440

Lys Ile Leu Leu Ala His Ile Leu Ile Gln Tyr Asp Val Lys Pro Val

465

470

475

480

cca gga gac gat gac aaa tac tac cgt cac gct ttt agc gtt cgt atg
1488

Pro Gly Asp Asp Asp Lys Tyr Tyr Arg His Ala Phe Ser Val Arg Met

485

490

495

cat cca acc aca aag ctc atg gta cgc cgg cgc aac gag gac atc ccg
1536

His Pro Thr Thr Lys Leu Met Val Arg Arg Arg Asn Glu Asp Ile Pro

500

505

510

ctc cct cat gac cgg tgc taa
1557

Leu Pro His Asp Arg Cys

515

<210> 48

<211> 518

<212> PRT

<213> Penicillium citrinum

<400> 48

Met Leu Gly Gln Val Leu Leu Thr Val Glu Ser Tyr Gln Trp Val Ser
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Thr Pro Gln Ala Leu Val Ala Val Ala Val Leu Leu Ser Leu Ile Ala

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Tyr	Arg	Leu	Arg	Gly	Arg	Gln	Ser	Glu	Leu	Gln	Val	Tyr	Asn	Pro	Lys
		35					40					45			
Lys	Trp	Trp	Glu	Leu	Thr	Thr	Met	Arg	Ala	Arg	Gln	Asp	Phe	Asp	Thr
	50					55					60				
Tyr	Gly	Pro	Ser	Trp	Ile	Glu	Ala	Trp	Phe	Ser	Lys	Asn	Asp	Lys	Pro
65					70					75					80
Leu	Arg	Phe	Ile	Val	Asp	Ser	Gly	Tyr	Cys	Thr	Ile	Leu	Pro	Ser	Ser
				85					90					95	
Met	Ala	Asp	Glu	Phe	Arg	Lys	Ile	Lys	Asp	Met	Cys	Met	Tyr	Lys	Phe
			100					105					110		
Leu	Ala	Asp	Asp	Phe	His	Ser	His	Leu	Pro	Gly	Phe	Asp	Gly	Phe	Lys
		115					120					125			
Glu	Ile	Cys	Gln	Asp	Ala	His	Leu	Val	Asn	Lys	Val	Val	Leu	Asn	Gln
	130					135					140				
Leu	Gln	Thr	Gln	Ala	Pro	Lys	Tyr	Thr	Lys	Pro	Leu	Ala	Thr	Leu	Ala
145					150					155					160
Asp	Ala	Thr	Ile	Ala	Lys	Leu	Phe	Gly	Lys	Ser	Glu	Glu	Trp	Gln	Thr
				165					170					175	
Ala	Pro	Val	Tyr	Ser	Asn	Gly	Leu	Asp	Leu	Val	Thr	Arg	Thr	Val	Thr
			180					185					190		
Leu	Ile	Met	Val	Gly	Asp	Lys	Ile	Cys	His	Asn	Glu	Glu	Trp	Leu	Asp
		195					200					205			
Ile	Ala	Lys	Asn	His	Ala	Val	Ser	Val	Ala	Val	Gln	Ala	Arg	Gln	Leu
	210					215					220				

Arg Val Trp Pro Met Leu Leu Arg Pro Leu Ala His Trp Phe Gln Pro
225 230 235 240

Gln Gly Arg Lys Leu Arg Asp Gln Val Arg Arg Ala Arg Lys Ile Ile
245 250 255

Asp Pro Glu Ile Gln Arg Arg Arg Ala Glu Lys Ala Ala Cys Val Ala
260 265 270

Lys Gly Val Gln Pro Pro Gln Tyr Val Asp Thr Met Gln Trp Phe Glu
275 280 285

Asp Thr Ala Asp Gly Arg Trp Tyr Asp Val Ala Gly Ala Gln Leu Ala
290 295 300

Met Asp Phe Ala Gly Ile Tyr Ala Ser Thr Asp Leu Phe Val Gly Ala
305 310 315 320

Leu Val Asp Ile Ala Arg His Pro Asp Leu Ile Gln Pro Leu Arg Gln
325 330 335

Glu Ile Arg Thr Val Ile Gly Glu Gly Gly Trp Thr Pro Ala Ser Leu
340 345 350

Phe Lys Leu Lys Leu Leu Asp Ser Cys Met Lys Glu Thr Gln Arg Ile
355 360 365

Lys Pro Val Glu Cys Ala Thr Met Arg Ser Thr Ala Leu Arg Asp Ile
370 375 380

Thr Leu Ser Asn Gly Leu Phe Ile Pro Lys Gly Glu Leu Ala Ala Val
385 390 395 400

Ala Ala Asp Arg Met Asn Asn Pro Asp Val Trp Glu Asn Pro Glu Asn
405 410 415

Tyr Asp Pro Tyr Arg Phe Met Arg Met Arg Glu Asp Pro Asp Lys Ala
420 425 430

Phe Thr Ala Gln Leu Glu Asn Thr Asn Gly Asp His Ile Gly Phe Gly
435 440 445

Trp Asn Pro Arg Ala Cys Pro Gly Arg Phe Phe Ala Ser Lys Glu Ile
450 455 460

Lys Ile Leu Leu Ala His Ile Leu Ile Gln Tyr Asp Val Lys Pro Val
465 470 475 480

Pro Gly Asp Asp Asp Lys Tyr Tyr Arg His Ala Phe Ser Val Arg Met
485 490 495

His Pro Thr Thr Lys Leu Met Val Arg Arg Arg Asn Glu Asp Ile Pro
500 505 510

Leu Pro His Asp Arg Cys
515

<210> 49

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<212> DNA

<213> *Penicillium citrinum*

<220>

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<222> (1)..(3522)

<400> 49

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Met Val Ala Ser Leu Leu Pro Ser Arg Phe Arg Gly Arg Glu Ser Met

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5

10

15

aat cag cag cac cct cta cgc tcg gga aat cgg gca ttg acc tcc aca
96

Asn Gln Gln His Pro Leu Arg Ser Gly Asn Arg Ala Leu Thr Ser Thr

20

25

30

ctc caa ttt cta tcc aaa acg gcg tgt cta cac ccg atc cat acc gtt
144

Leu Gln Phe Leu Ser Lys Thr Ala Cys Leu His Pro Ile His Thr Val

35

40

45

tgc acc ata gct att cta gct agt acc aca tac gtt gga cta ctc aaa
192

Cys Thr Ile Ala Ile Leu Ala Ser Thr Thr Tyr Val Gly Leu Leu Lys

50

55

60

gac agc ttc ttc cat ggc ccc gca aac gtt gat aaa gca gaa tgg ggc
240

Asp Ser Phe Phe His Gly Pro Ala Asn Val Asp Lys Ala Glu Trp Gly

65

70

75

80

tct ttg gtc gaa gga agt cga agc ttg atc acc ggc cca cag aat ggc
288

Ser Leu Val Glu Gly Ser Arg Ser Leu Ile Thr Gly Pro Gln Asn Gly

85

90

95

tgg aag tgg cag agc ttc gac ggg gat gca gat gtt ctc gga gat ttc
336

Trp Lys Trp Gln Ser Phe Asp Gly Asp Ala Asp Val Leu Gly Asp Phe

100

105

110

aac cat caa gca cta atg acc ttg gta ttc ccg ggg tca tat ggg gtt
384

Asn His Gln Ala Leu Met Thr Leu Val Phe Pro Gly Ser Tyr Gly Val

115

120

125

gca tct caa gca gcc tca cca ttc ctt gct ccc ctc cct gtg aac cta

432
Ala Ser Gln Ala Ala Ser Pro Phe Leu Ala Pro Leu Pro Val Asn Leu
130 135 140

tct gtg att gac ctt ccc tca acg tcg agc cct tta acc gcc tat tcg
480
Ser Val Ile Asp Leu Pro Ser Thr Ser Ser Pro Leu Thr Ala Tyr Ser
145 150 155 160

aaa gat aaa gtt ttc gcc ttc tct gtg gaa tac agc agc gcg ccg gaa
528
Lys Asp Lys Val Phe Ala Phe Ser Val Glu Tyr Ser Ser Ala Pro Glu
165 170 175

ctc gtg gct gct gtt caa gaa atc ccc aac aac agt gcc gac ctg aaa
576
Leu Val Ala Ala Val Gln Glu Ile Pro Asn Asn Ser Ala Asp Leu Lys
180 185 190

ttg cag gag acg caa ttg atc gag atg gaa cgc cag atg tgg atc atg
624
Leu Gln Glu Thr Gln Leu Ile Glu Met Glu Arg Gln Met Trp Ile Met
195 200 205

aag gct gcc agg gct cac aca aaa cgc agc ctt gct caa tgg gtg cac
672
Lys Ala Ala Arg Ala His Thr Lys Arg Ser Leu Ala Gln Trp Val His
210 215 220

gat acc tgg aca gag tct ctt gat ctt atc aag agc gct caa acg ctc
720
Asp Thr Trp Thr Glu Ser Leu Asp Leu Ile Lys Ser Ala Gln Thr Leu
225 230 235 240

gac gtg gtt gtc atg gtg cta ggt tat ata tca atg cac ttg act ttc
768

Asp Val Val Val Met Val Leu Gly Tyr Ile Ser Met His Leu Thr Phe
245 250 255

gtc tca ctc ttc ctc agc atg aaa aaa ttg gga tcg aag gtt tgg ctg
816
Val Ser Leu Phe Leu Ser Met Lys Lys Leu Gly Ser Lys Val Trp Leu
260 265 270

gct aca agc gtc ctt ttg tcg tca aca ttt gcc ttt ctc ctc ggt ctc
864
Ala Thr Ser Val Leu Leu Ser Ser Thr Phe Ala Phe Leu Leu Gly Leu
275 280 285

gac gtg gcc ata aga cta ggg gtt ccg atg agc atg agg ttg cta tcc
912
Asp Val Ala Ile Arg Leu Gly Val Pro Met Ser Met Arg Leu Leu Ser
290 295 300

gaa ggc ctc ccc ttc ttg gtg gtg atc gtt ggc ttt gag aag agc atc
960
Glu Gly Leu Pro Phe Leu Val Val Ile Val Gly Phe Glu Lys Ser Ile
305 310 315 320

act ctg acc agg gct gtt ttg tcc tat gct gtg cag cac cga aag ccc
1008
Thr Leu Thr Arg Ala Val Leu Ser Tyr Ala Val Gln His Arg Lys Pro
325 330 335

cag aag ata cag tct gac cag ggt agc gtg aca gcc att gct gaa agt
1056
Gln Lys Ile Gln Ser Asp Gln Gly Ser Val Thr Ala Ile Ala Glu Ser
340 345 350

acc atc aat tac gcc gta cga agc gcc att cgg gag aag ggt tac aat
1104
Thr Ile Asn Tyr Ala Val Arg Ser Ala Ile Arg Glu Lys Gly Tyr Asn

355	360	365
atc gtg tgc cac tac gtg gtc gag atc ctg ctc cta gtt atc ggt gct		
1152		
Ile Val Cys His Tyr Val Val Glu Ile Leu Leu Leu Val Ile Gly Ala		
370	375	380
gtc tta ggc atc caa ggt ggg cta cag cac ttc tgt gtt cta gct gca		
1200		
Val Leu Gly Ile Gln Gly Gly Leu Gln His Phe Cys Val Leu Ala Ala		
385	390	395
400		
ttg atc ctg ttc ttt gac tgt ctg ctg ctg ttt aca ttc tac act gcg		
1248		
Leu Ile Leu Phe Phe Asp Cys Leu Leu Leu Phe Thr Phe Tyr Thr Ala		
405	410	415
att ctg tct atc aag ctc gag gta aac cgc ctc aaa cgt cat atc aac		
1296		
Ile Leu Ser Ile Lys Leu Glu Val Asn Arg Leu Lys Arg His Ile Asn		
420	425	430
atg cgg tac gcg ttg gaa gat gag ggt ctc agt cag cgg acg gcg gag		
1344		
Met Arg Tyr Ala Leu Glu Asp Glu Gly Leu Ser Gln Arg Thr Ala Glu		
435	440	445
agt gtc gcg acc agc aat gat gcc caa gac agt gca cgt aca tat ctg		
1392		
Ser Val Ala Thr Ser Asn Asp Ala Gln Asp Ser Ala Arg Thr Tyr Leu		
450	455	460
ttt ggc aat gat atg aaa ggc agc agt gtt ccg aag ttc aaa ttc tgg		
1440		
Phe Gly Asn Asp Met Lys Gly Ser Ser Val Pro Lys Phe Lys Phe Trp		

465 470 475 480

atg gtc gtt ggt ttc ctt atc gtc aac ctc gtc aac atc ggc tcc acc
1488

Met Val Val Gly Phe Leu Ile Val Asn Leu Val Asn Ile Gly Ser Thr

485 490 495

ctt ttc caa gcc tct tct agt gga tcg ttg tcc agt ata tca tct tgg
1536

Leu Phe Gln Ala Ser Ser Ser Gly Ser Leu Ser Ser Ile Ser Ser Trp

500 505 510

acc gaa agt ctg agc gga tcg gcc att aaa ccc ccg ctt gag ccc ttc
1584

Thr Glu Ser Leu Ser Gly Ser Ala Ile Lys Pro Pro Leu Glu Pro Phe

515 520 525

aag gta gct gga agt gga cta gat gaa cta ctt ttc cag gca aga ggg
1632

Lys Val Ala Gly Ser Gly Leu Asp Glu Leu Leu Phe Gln Ala Arg Gly

530 535 540

cgc ggt caa tcg act atg gtc act gtc ctc gcc ccc atc aag tac gaa
1680

Arg Gly Gln Ser Thr Met Val Thr Val Leu Ala Pro Ile Lys Tyr Glu

545 550 555 560

cta gag tat cct tcc att cac cgt ggt acc tcg cag cta cac gag tat
1728

Leu Glu Tyr Pro Ser Ile His Arg Gly Thr Ser Gln Leu His Glu Tyr

565 570 575

gga gtt ggt gga aaa atg gtc ggt agc ctg ctc acc agc ctg gaa gat
1776

Gly Val Gly Gly Lys Met Val Gly Ser Leu Leu Thr Ser Leu Glu Asp

580 585 590

ccc gtc ctc tcc aaa tgg gtg ttt gtg gca ctt gcc cta agt gtc gct
1824

Pro Val Leu Ser Lys Trp Val Phe Val Ala Leu Ala Leu Ser Val Ala

595

600

605

ctg aac agc tat ctg ttc aag gcc gcc aga ctg gga atc aaa gat cct
1872

Leu Asn Ser Tyr Leu Phe Lys Ala Ala Arg Leu Gly Ile Lys Asp Pro

610

615

620

aat ctc ccg agt cac cca gtt gat cca gtt gag ctt gac cag gcc gaa
1920

Asn Leu Pro Ser His Pro Val Asp Pro Val Glu Leu Asp Gln Ala Glu

625

630

635

640

agc ttc aac gct gcc cag aac cag acc cct cag att caa tca agt ctc
1968

Ser Phe Asn Ala Ala Gln Asn Gln Thr Pro Gln Ile Gln Ser Ser Leu

645

650

655

caa gct cct cag acc aga gtg ttc act cct acc acc acc gac agt gac
2016

Gln Ala Pro Gln Thr Arg Val Phe Thr Pro Thr Thr Thr Asp Ser Asp

660

665

670

agt gat gcc tca tta gtc tta att aaa gca tct cta aag gtc act aag
2064

Ser Asp Ala Ser Leu Val Leu Ile Lys Ala Ser Leu Lys Val Thr Lys

675

680

685

cga gca gaa gga aag aca gcc act agt gaa ctt ccc gtg tct cgc aca
2112

Arg Ala Glu Gly Lys Thr Ala Thr Ser Glu Leu Pro Val Ser Arg Thr

690

695

700

caa atc gaa ctg gac aat ttg ctg aag cag aac aca atc agc gag ttg
2160

Gln Ile Glu Leu Asp Asn Leu Leu Lys Gln Asn Thr Ile Ser Glu Leu

705

710

715

720

aac gat gag gat gtc gtt gcc ttg tct ttg cgg gga aag gtt ccc ggg
2208

Asn Asp Glu Asp Val Val Ala Leu Ser Leu Arg Gly Lys Val Pro Gly

725

730

735

tat gcc cta gag aag agt ctc aaa gac tgc act cgt gcc gtc aag gtt
2256

Tyr Ala Leu Glu Lys Ser Leu Lys Asp Cys Thr Arg Ala Val Lys Val

740

745

750

cgc cgc tct atc att tcg agg aca ccg gct acc gca gag ctt aca agt
2304

Arg Arg Ser Ile Ile Ser Arg Thr Pro Ala Thr Ala Glu Leu Thr Ser

755

760

765

atg ctg gag cac tcg aag ctg ccg tac gaa aac tac gcc tgg gaa cgc
2352

Met Leu Glu His Ser Lys Leu Pro Tyr Glu Asn Tyr Ala Trp Glu Arg

770

775

780

gtg ctc ggt gca tgt tgc gag aac gtt att ggc tat atg cca gtc cct
2400

Val Leu Gly Ala Cys Cys Glu Asn Val Ile Gly Tyr Met Pro Val Pro

785

790

795

800

gtt ggc gtc gcc ggt cct att gtt atc gac ggc aag agt tat ttc att
2448

Val Gly Val Ala Gly Pro Ile Val Ile Asp Gly Lys Ser Tyr Phe Ile

805

810

815

cct atg gca acc acc gag ggc gtc ctc gtc gct agt gct agc cgt ggc

2496
Pro Met Ala Thr Thr Glu Gly Val Leu Val Ala Ser Ala Ser Arg Gly
820 825 830

agt aag gca atc aac ctc ggt ggc ggt gcc gtg aca gtc ctg act ggc
2544
Ser Lys Ala Ile Asn Leu Gly Gly Gly Ala Val Thr Val Leu Thr Gly
835 840 845

gac ggt atg aca cga ggc ccg tgt gtg aag ttt gat gtc ctt gaa cga
2592
Asp Gly Met Thr Arg Gly Pro Cys Val Lys Phe Asp Val Leu Glu Arg
850 855 860

gct ggt gct gct aag atc tgg ctc gat tcg gac gtc ggc cag acc gta
2640
Ala Gly Ala Ala Lys Ile Trp Leu Asp Ser Asp Val Gly Gln Thr Val
865 870 875 880

atg aaa gaa gcc ttc aat tca acc agc aga ttt gcg cgc tta caa agt
2688
Met Lys Glu Ala Phe Asn Ser Thr Ser Arg Phe Ala Arg Leu Gln Ser
885 890 895

atg cgg aca act atc gcc ggt act cac tta tat att cga ttt aag act
2736
Met Arg Thr Thr Ile Ala Gly Thr His Leu Tyr Ile Arg Phe Lys Thr
900 905 910

act act ggc gac gct atg gga atg aat atg att tct aag ggc gtg gag
2784
Thr Thr Gly Asp Ala Met Gly Met Asn Met Ile Ser Lys Gly Val Glu
915 920 925

cat gca ctg aat gtt atg gcg aca gag gca ggt ttc agc gat atg aat
2832

His Ala Leu Asn Val Met Ala Thr Glu Ala Gly Phe Ser Asp Met Asn

930

935

940

att att acc cta tca gga aat tac tgt acg gat aag aaa cct tca gct

2880

Ile Ile Thr Leu Ser Gly Asn Tyr Cys Thr Asp Lys Lys Pro Ser Ala

945

950

955

960

ttg aat tgg atc gat gga cgg ggc aag ggc att gtg gcc gaa gcc atc

2928

Leu Asn Trp Ile Asp Gly Arg Gly Lys Gly Ile Val Ala Glu Ala Ile

965

970

975

ata ccg gcg aac gtt gtc agg gat gtc tta aag agc gat gtg gat agc

2976

Ile Pro Ala Asn Val Val Arg Asp Val Leu Lys Ser Asp Val Asp Ser

980

985

990

atg gtt cag ctg aac ata tcg aaa aat ctg att ggg tcc gct atg gct

3024

Met Val Gln Leu Asn Ile Ser Lys Asn Leu Ile Gly Ser Ala Met Ala

995

1000

1005

ggc tca gtt ggc ggc ttc aac gcc caa gct gcc aat ctt gcg gca

3069

Gly Ser Val Gly Gly Phe Asn Ala Gln Ala Ala Asn Leu Ala Ala

1010

1015

1020

gcc att ttc att gcc aca ggt cag gat ccg gcg caa gtt gtg gag

3114

Ala Ile Phe Ile Ala Thr Gly Gln Asp Pro Ala Gln Val Val Glu

1025

1030

1035

agc gct aac tgc atc act ctg atg aac aat ctt cgc gga tcg ctt

3159

Ser Ala Asn Cys Ile Thr Leu Met Asn Asn Leu Arg Gly Ser Leu

1040	1045	1050
caa atc tct gtc tcc atg ccg	tct att gag gtt gga	acg ttg ggc
3204		
Gln Ile Ser Val Ser Met Pro	Ser Ile Glu Val Gly	Thr Leu Gly
1055	1060	1065
ggg ggt acg att ctg gag ccc	cag ggc gca atg ctt	gac atg ctt
3249		
Gly Gly Thr Ile Leu Glu Pro	Gln Gly Ala Met Leu	Asp Met Leu
1070	1075	1080
ggg gtc cgc gga tca cac ccg	acc act ccc ggt gag	aat gca cgt
3294		
Gly Val Arg Gly Ser His Pro	Thr Thr Pro Gly Glu	Asn Ala Arg
1085	1090	1095
caa ctt gcg cgc atc atc gga	agc gct gtt ttg gct	ggg gag ctc
3339		
Gln Leu Ala Arg Ile Ile Gly	Ser Ala Val Leu Ala	Gly Glu Leu
1100	1105	1110
tcg cta tgt gct gcc cta gcc	gcc ggt cac ctg gtc	aag gcg cac
3384		
Ser Leu Cys Ala Ala Leu Ala	Ala Gly His Leu Val	Lys Ala His
1115	1120	1125
atg gcg cac aac cgt tct gcc	ccg gca tct tca gcc	cct tct cga
3429		
Met Ala His Asn Arg Ser Ala	Pro Ala Ser Ser Ala	Pro Ser Arg
1130	1135	1140
agt gtc tcc ccg tca ggc gga	acc agg aca gtc cct	gtt cct aac
3474		
Ser Val Ser Pro Ser Gly Gly	Thr Arg Thr Val Pro	Val Pro Asn

1145

1150

1155

aat gca ctg agg ccg agt gct gca gct act gat cgg gct cga cgc
3519

Asn Ala Leu Arg Pro Ser Ala Ala Ala Thr Asp Arg Ala Arg Arg

1160

1165

1170

tga
3522

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Asn Gln Gln His Pro Leu Arg Ser Gly Asn Arg Ala Leu Thr Ser Thr
20 25 30

Leu Gln Phe Leu Ser Lys Thr Ala Cys Leu His Pro Ile His Thr Val
35 40 45

Cys Thr Ile Ala Ile Leu Ala Ser Thr Thr Tyr Val Gly Leu Leu Lys
50 55 60

Asp Ser Phe Phe His Gly Pro Ala Asn Val Asp Lys Ala Glu Trp Gly
65 70 75 80

Ser Leu Val Glu Gly Ser Arg Ser Leu Ile Thr Gly Pro Gln Asn Gly
85 90 95

Trp Lys Trp Gln Ser Phe Asp Gly Asp Ala Asp Val Leu Gly Asp Phe
100 105 110

Asn His Gln Ala Leu Met Thr Leu Val Phe Pro Gly Ser Tyr Gly Val
115 120 125

Ala Ser Gln Ala Ala Ser Pro Phe Leu Ala Pro Leu Pro Val Asn Leu
130 135 140

Ser Val Ile Asp Leu Pro Ser Thr Ser Ser Pro Leu Thr Ala Tyr Ser
145 150 155 160

Lys Asp Lys Val Phe Ala Phe Ser Val Glu Tyr Ser Ser Ala Pro Glu
165 170 175

Leu Val Ala Ala Val Gln Glu Ile Pro Asn Asn Ser Ala Asp Leu Lys
180 185 190

Leu Gln Glu Thr Gln Leu Ile Glu Met Glu Arg Gln Met Trp Ile Met
195 200 205

Lys Ala Ala Arg Ala His Thr Lys Arg Ser Leu Ala Gln Trp Val His
210 215 220

Asp Thr Trp Thr Glu Ser Leu Asp Leu Ile Lys Ser Ala Gln Thr Leu
225 230 235 240

Asp Val Val Val Met Val Leu Gly Tyr Ile Ser Met His Leu Thr Phe
245 250 255

Val Ser Leu Phe Leu Ser Met Lys Lys Leu Gly Ser Lys Val Trp Leu
260 265 270

Ala Thr Ser Val Leu Leu Ser Ser Thr Phe Ala Phe Leu Leu Gly Leu
275 280 285

Asp Val Ala Ile Arg Leu Gly Val Pro Met Ser Met Arg Leu Leu Ser
290 295 300

Glu Gly Leu Pro Phe Leu Val Val Ile Val Gly Phe Glu Lys Ser Ile
305 310 315 320

Thr Leu Thr Arg Ala Val Leu Ser Tyr Ala Val Gln His Arg Lys Pro
325 330 335

Gln Lys Ile Gln Ser Asp Gln Gly Ser Val Thr Ala Ile Ala Glu Ser
340 345 350

Thr Ile Asn Tyr Ala Val Arg Ser Ala Ile Arg Glu Lys Gly Tyr Asn
355 360 365

Ile Val Cys His Tyr Val Val Glu Ile Leu Leu Leu Val Ile Gly Ala
370 375 380

Val Leu Gly Ile Gln Gly Gly Leu Gln His Phe Cys Val Leu Ala Ala
385 390 395 400

Leu Ile Leu Phe Phe Asp Cys Leu Leu Leu Phe Thr Phe Tyr Thr Ala
405 410 415

Ile Leu Ser Ile Lys Leu Glu Val Asn Arg Leu Lys Arg His Ile Asn
420 425 430

Met Arg Tyr Ala Leu Glu Asp Glu Gly Leu Ser Gln Arg Thr Ala Glu
435 440 445

Ser Val Ala Thr Ser Asn Asp Ala Gln Asp Ser Ala Arg Thr Tyr Leu
450 455 460

Phe Gly Asn Asp Met Lys Gly Ser Ser Val Pro Lys Phe Lys Phe Trp
465 470 475 480

Met Val Val Gly Phe Leu Ile Val Asn Leu Val Asn Ile Gly Ser Thr
485 490 495

Leu Phe Gln Ala Ser Ser Ser Gly Ser Leu Ser Ser Ile Ser Ser Trp

500						505						510					
Thr	Glu	Ser	Leu	Ser	Gly	Ser	Ala	Ile	Lys	Pro	Pro	Leu	Glu	Pro	Phe		
		515					520					525					
Lys	Val	Ala	Gly	Ser	Gly	Leu	Asp	Glu	Leu	Leu	Phe	Gln	Ala	Arg	Gly		
	530					535					540						
Arg	Gly	Gln	Ser	Thr	Met	Val	Thr	Val	Leu	Ala	Pro	Ile	Lys	Tyr	Glu		
545					550					555					560		
Leu	Glu	Tyr	Pro	Ser	Ile	His	Arg	Gly	Thr	Ser	Gln	Leu	His	Glu	Tyr		
				565					570					575			
Gly	Val	Gly	Gly	Lys	Met	Val	Gly	Ser	Leu	Leu	Thr	Ser	Leu	Glu	Asp		
			580					585					590				
Pro	Val	Leu	Ser	Lys	Trp	Val	Phe	Val	Ala	Leu	Ala	Leu	Ser	Val	Ala		
		595					600					605					
Leu	Asn	Ser	Tyr	Leu	Phe	Lys	Ala	Ala	Arg	Leu	Gly	Ile	Lys	Asp	Pro		
	610					615					620						
Asn	Leu	Pro	Ser	His	Pro	Val	Asp	Pro	Val	Glu	Leu	Asp	Gln	Ala	Glu		
625					630					635					640		
Ser	Phe	Asn	Ala	Ala	Gln	Asn	Gln	Thr	Pro	Gln	Ile	Gln	Ser	Ser	Leu		
			645						650					655			
Gln	Ala	Pro	Gln	Thr	Arg	Val	Phe	Thr	Pro	Thr	Thr	Thr	Asp	Ser	Asp		
			660					665					670				
Ser	Asp	Ala	Ser	Leu	Val	Leu	Ile	Lys	Ala	Ser	Leu	Lys	Val	Thr	Lys		
		675					680					685					
Arg	Ala	Glu	Gly	Lys	Thr	Ala	Thr	Ser	Glu	Leu	Pro	Val	Ser	Arg	Thr		
	690					695					700						

Gln Ile Glu Leu Asp Asn Leu Leu Lys Gln Asn Thr Ile Ser Glu Leu
705 710 715 720

Asn Asp Glu Asp Val Val Ala Leu Ser Leu Arg Gly Lys Val Pro Gly
725 730 735

Tyr Ala Leu Glu Lys Ser Leu Lys Asp Cys Thr Arg Ala Val Lys Val
740 745 750

Arg Arg Ser Ile Ile Ser Arg Thr Pro Ala Thr Ala Glu Leu Thr Ser
755 760 765

Met Leu Glu His Ser Lys Leu Pro Tyr Glu Asn Tyr Ala Trp Glu Arg
770 775 780

Val Leu Gly Ala Cys Cys Glu Asn Val Ile Gly Tyr Met Pro Val Pro
785 790 795 800

Val Gly Val Ala Gly Pro Ile Val Ile Asp Gly Lys Ser Tyr Phe Ile
805 810 815

Pro Met Ala Thr Thr Glu Gly Val Leu Val Ala Ser Ala Ser Arg Gly
820 825 830

Ser Lys Ala Ile Asn Leu Gly Gly Gly Ala Val Thr Val Leu Thr Gly
835 840 845

Asp Gly Met Thr Arg Gly Pro Cys Val Lys Phe Asp Val Leu Glu Arg
850 855 860

Ala Gly Ala Ala Lys Ile Trp Leu Asp Ser Asp Val Gly Gln Thr Val
865 870 875 880

Met Lys Glu Ala Phe Asn Ser Thr Ser Arg Phe Ala Arg Leu Gln Ser
885 890 895

Met Arg Thr Thr Ile Ala Gly Thr His Leu Tyr Ile Arg Phe Lys Thr
900 905 910

Thr Thr Gly Asp Ala Met Gly Met Asn Met Ile Ser Lys Gly Val Glu
915 920 925

His Ala Leu Asn Val Met Ala Thr Glu Ala Gly Phe Ser Asp Met Asn
930 935 940

Ile Ile Thr Leu Ser Gly Asn Tyr Cys Thr Asp Lys Lys Pro Ser Ala
945 950 955 960

Leu Asn Trp Ile Asp Gly Arg Gly Lys Gly Ile Val Ala Glu Ala Ile
965 970 975

Ile Pro Ala Asn Val Val Arg Asp Val Leu Lys Ser Asp Val Asp Ser
980 985 990

Met Val Gln Leu Asn Ile Ser Lys Asn Leu Ile Gly Ser Ala Met Ala
995 1000 1005

Gly Ser Val Gly Gly Phe Asn Ala Gln Ala Ala Asn Leu Ala Ala
1010 1015 1020

Ala Ile Phe Ile Ala Thr Gly Gln Asp Pro Ala Gln Val Val Glu
1025 1030 1035

Ser Ala Asn Cys Ile Thr Leu Met Asn Asn Leu Arg Gly Ser Leu
1040 1045 1050

Gln Ile Ser Val Ser Met Pro Ser Ile Glu Val Gly Thr Leu Gly
1055 1060 1065

Gly Gly Thr Ile Leu Glu Pro Gln Gly Ala Met Leu Asp Met Leu
1070 1075 1080

Gly Val Arg Gly Ser His Pro Thr Thr Pro Gly Glu Asn Ala Arg
1085 1090 1095

Gln Leu Ala Arg Ile Ile Gly Ser Ala Val Leu Ala Gly Glu Leu

1100	1105	1110
Ser Leu Cys Ala Ala Leu Ala	Ala Gly His Leu Val	Lys Ala His
1115	1120	1125
Met Ala His Asn Arg Ser Ala	Pro Ala Ser Ser Ala	Pro Ser Arg
1130	1135	1140
Ser Val Ser Pro Ser Gly Gly	Thr Arg Thr Val Pro	Val Pro Asn
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